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DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. The RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 of 1940

TO CALLERS AND TELEPHONERS

Our office hours until further notice are:—

Mondays to Fridays - 9.30 a.m. till 4.30 p.m.

The office will be closed on Saturdays.

The Limitations of Planning

WAR conditions are giving wide scope to that ruthless and efficient teacher, experience. Before the war there was a tendency to plan for possible contingencies which had, and could have, no precedent. It is no condemnation of the intentions of the planners that many of their schemes failed to fit the events when they arose. Their wisdom is proved by their ready withdrawal of plans which were seen to break down in practice, and their willingness to leave the arrangements for the future to be extemporised by those directly in touch with local conditions. Naturally, extemporisation is largely a matter of trial and error, but it should lead steadily in the direction of perfection, even though in war conditions perfection remains always remote. Almost immediately after the outbreak of war a drastically reduced train service was introduced on the main-line railways, in accordance with a timetable prepared some months earlier. It was quickly seen, however, that this restricted service did not meet the actual conditions that arose, and it was replaced by one that, while providing adequately for military requirements, yet gave reasonably good facilities for the needs of the civil population.

* * *

Extemporisation

After a year of war, conditions in Great Britain underwent an important change with the widespread and intensified air raids, especially upon London and other great centres of population. Train services have suffered interference from three main causes, the first of which, the blackout, has been operating since war began. Work on the railways after dusk, and with only the aid of greatly reduced lighting, is difficult enough; but, when an air-raid warning is in force, and even this dim lighting is extinguished, it is marvellous that the slowing down of work in stations and yards is not much worse than it is. During the last few weeks warnings at night have been almost continuous in London and many other parts. Add to this the necessity for trains to travel at slow speed, ready to pull up within a short distance in the event of a sudden emergency, and the delays suffered by trains are on the whole remarkably slight. The third trouble is the total interruption of lines which have become damaged or obstructed by bombing. The last cause demands immediate extemporisation pending restoration of the line, and, if the engineers have risen to the occasion magnificently—as we suggested in a leading article last week—the traffic operators have used their curtailed facilities with no less ingenuity.

* * *

Leonor Fresnel Loree

A citizen of the United States of America whose influence on railway matters in his own country, apart from his colourful personality, made him extremely well known on this side of the Atlantic was the late Mr. Leonor F. Loree, whose passing we record at page 415. In the course of his career, Mr. Loree held the presidency of three important U.S.A. railways, and retained the last of these for 31 years. He was trained as an engineer, but was equally skilled as an operating officer, and will be long remembered as the protagonist of a new trunk line from New York to Pittsburgh and Chicago. Mr. Loree's views upon the running of all departments of a railway are expressed with a wealth of illustration and almost disconcerting vigour in his book "Railroad Freight Transportation." It covers not merely the field indicated by its title but also delves into history. His thoroughness was well illustrated at the time he was planning to establish a library for one of his pet schemes—the New Jersey College for Women. He spent three weeks with the staff of the Bureau of Railway Economics investigating the art of the librarian and book buyer. He served as the American member of the Royal Commission which in 1931 investigated the position of railway transport in Canada and on which Lord Ashfield was the British representative. A signal honour was paid to Mr. Loree

in 1933, when his company, the Delaware and Hudson Railroad, named a four-cylinder triple-expansion locomotive using steam at 500 lb. per sq. in. pressure the *L. F. Loree*.

* * *

Overseas Railway Traffics

Except on the Buenos Ayres Great Southern the rate of decrease in Argentine railway traffics for the 14th week of the financial year has shown some slackening. On the Buenos Ayres & Pacific the fall of 10,000 pesos in that week contrasts with one of 75,000 pesos in the previous week, the decrease of 52,000 pesos on the Buenos Ayres Western contrasts with one of 142,000 pesos, and the weekly drop on the Central Argentine has fallen from 469,450 pesos to 297,700 pesos. The Entre Rios shows an increase of 5,700 pesos for the 14th week, and the Argentine North Eastern aggregate decrease at the end of the 14th week is not more than 103,000 pesos. On the Central Uruguay the aggregate increase to date in sterling is £14,646, but currency receipts are down.

	No. of Week	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Increase or Decrease
Buenos Ayres & Pacific*	14th	1,170	— 10	15,649	— 1,656
Buenos Ayres Great Southern*	14th	1,682	— 336	26,067	— 693
Buenos Ayres Western*	14th	629	— 52	8,640	— 1,095
Central Argentine*	14th	1,263	— 298	19,671	— 8,576
Canadian Pacific	40th	738,800	— 134,600	25,108,200	+ 3,146,000
Bombay, Baroda & Central India	26th	261,000	— 11,175	4,770,750	+ 528,225

* Traffic returns in thousands of pesos.

San Paulo Railway receipts for the 39th and 40th weeks of 1940 are slightly down both in sterling and currency, but the aggregate receipts to date in sterling are up £156,452, with a comparatively small decrease in currency takings.

* * *

The New Minister on his Task

On October 11 the new Minister of Transport invited members of the press to meet him, and gave them some impression of the manner in which he faces his task as fourteenth holder of office. With an almost Churchillian breeziness of manner and expression, Colonel Moore-Brabazon declared that he agreed with the Prime Minister, who, in appointing him, had told him it was a front-line job. The diverse functions of the Ministry, which included all forms of land transport and also electricity, meant that the ordinary life of a citizen was touched at many points, and he had greater opportunity to grumble at the Ministry of Transport than at any other Department. Of the railways the Minister said that a decision on higher charges would be forthcoming "in about a fortnight" and that the terms of the financial agreement between the Government and the companies would be issued at the same time. The matter would have to be debated in Parliament. More generally, he declared that, whatever the future of the railways might be, it was essential that they should be kept in a healthy state and he emphasised that within the Ministry all transport problems were under constant consideration, but none was looked at from the viewpoint of any private interest or predilection. The railways were the arteries through which flowed the life-blood of the nation. Changing his metaphor, he said that the railways were harnessed to the State and that they had to deliver the goods. Recognising that the lines were vulnerable to air attack, he paid tribute to the remarkable manner in which difficulties had been overcome. He added that the establishment of the London Passenger Transport Board had been "justified 100 per cent." by its use in the war, and said of the Central Electricity Board "Grid" that, if it had not already been in being, it would have been necessary to invent it.

* * *

Ministry of Transport Organisation

IN THE RAILWAY GAZETTE last week attention was drawn to some of the disadvantages which necessarily result from the frequency with which the Minister of Transport has been changed. Mr. Frederick Smith, in the course of an address to the Institute of Transport on Monday last, of which we reproduce a summary at page 421, touched on another important aspect of the organisation of the Ministry which merits attention. He declared that it was not designed for the solu-

tion of the major problems which must arise in any reconstruction of transport policy. Here it might well be interpolated that as at present constituted it is not best fitted for dealing with day-to-day transport matters. Mr. Smith puts it no higher than saying that "it is singularly unfortunate that the Ministry of Transport has followed traditional Civil Service lines, and is founded on the belief that any Civil Servant can do any job, however trained or untrained professionally he may be." As he says, it would be inconceivable that the Board of Admiralty should not be composed mainly of professional naval officers, and the Air Council of professional air officers. Yet the Ministry of Transport, which has to deal with matters at least as highly technical as do the Service departments, has no similar general staff composed mainly of full-time professional transport men. He suggests that the Minister should be assisted by a Transport Council, consisting of the Permanent Secretary to the Ministry and professional transport officers experienced in different branches but severed from their connections with individual interests and becoming full-time servants of the State. Only men of this type would be able effectively to grapple with some of the transport problems which must arise with the end of the war and which it is essential should be dealt with speedily if an aftermath similar to that of the last war is to be avoided.

* * *

Need for Realism

One of the major problems which would have to be faced in reconstructing the Ministry on the lines suggested by Mr. Smith would be making the posts to be created sufficiently attractive to the right type of personnel. To obtain the desired results it would be essential to attract first-rate executives and this is hardly likely to be achieved by the emoluments which the Treasury deems sufficient for the best that the Civil Service can offer. It has for long been said that in Great Britain the efficient man who serves his country may gain in patriotism but must deplete his pocket. There can be no question that the fruits of success in commerce or industry are vastly greater than the Civil Servant can aspire to, and in many cases the difference is disproportionate to the value of the work done or the responsibility undertaken. It would be wrong in principle to base the claim to the services of first-class executives on an appeal to their patriotism or willingness to assist the State. There is no good reason in equity why a man of the status and capacity of a railway general manager, for example, should accept, or give of his best for, the £3,000 a year or so which the Treasury seems to consider top pay for permanent officials, but it is only by securing the services of men of this type and capacity that the necessary ends will be achieved. During the war the Ministry has been fortunate in securing Mr. Gilbert S. Szlumper as Railway Control Officer and this is undoubtedly a step in the right direction. There is, of course, a very wide difference between a wartime appointment of this kind and the permanent establishment that Mr. Smith has in mind.

* * *

An Echo of the Wellingborough Accident

The accident to the L.M.S.R. express on October 12, brief details of which are given in a news paragraph on page 422, recalls the disastrous derailment at Wellingborough, Midland Railway, on September 2, 1898, when seven lives were lost and 65 persons injured. Then, the 6.45 p.m. express from St. Pancras struck a luggage trolley which had fallen from the down platform on the down main line. The platform sloped towards the track with a fall of 8 in. in 16 ft. 5 in., characterised by Colonel Yorke in his report as "excessive" and "far beyond anything required for drainage," which was the reason for which the slope existed. The trolley was in the charge of a postman, who declared he had locked the front wheels before releasing his hold; he blamed some boys for interfering with it afterwards, but the evidence on these points was conflicting. Colonel Yorke found that a barrow falling on the line was "by no means rare" and recommended that platforms should either be level or slope away from the line. He thought it too early "to express a definite

opinion" as to how to deal with the danger, but discussed automatic brakes and other means of securing such vehicles against accidental movement. The Wellingborough accident was the first one that had been occasioned in this manner and attracted a great deal of attention. Some people called for "cow catchers," but Colonel Yorke showed that they could not have been effective in such a case.

* * *

Formal Inquiries in Wartime

The usual official inquiry on behalf of the Minister of Transport into the Wembley derailment of Saturday last opened yesterday, and to many there may seem some incongruity in holding a formal inquiry into the circumstances of a few casualties in a railway accident when many more persons are being killed daily in air raids. As a mere abstract proposition there is something to be said for the view, but it has to be borne in mind that there is in any case no reason why any life should be lost when it can be avoided, and on the contrary there is every reason against it, and the purpose of holding an inquiry into a railway accident is to ascertain whether it was in any measure avoidable and what steps may seem advisable, having regard to all the circumstances involved, to prevent a recurrence. Every accident is liable to create serious disturbance to essential transport services and there is thus an added reason for taking all practical steps to render accidents as few as possible. Enemy action must inevitably create some disturbance, but there is no need for our own to add to our difficulties.

* * *

Thermodynamics of the Locomotive

Apart from high working pressures and the degree of superheating, other factors are included in modern locomotives which improve their thermodynamic characteristics. Greater care is exercised in the design of cylinders in order to permit of high speeds with coupled wheels of moderate or small diameters, by providing increased cross-sectional areas for the steam passages, thus reducing loss of pressure due to wiredrawing. As was remarked by Mr. H. Young who read a paper on the subject at a meeting of the New South Wales branch of the Institution of Locomotive Engineers, these passages have been increased by 25-100 per cent. in area compared with former normal practice, and a ratio of 10 to 1 for piston area to steam port area is now superseded by a ratio of 5 to 1. Increases in steam pipe diameters, and steam chest volumes also help to equalise the pressures in the steam chest throughout the stroke. As a result of these refinements, the steam locomotive can now give an overall thermal efficiency of 8 to 10 per cent. Considerable progress has been made by the use of greatly reduced exhaust back pressures, and at the same time improved draught efficiency in smoke-box arrangements results in increased boiler output and tractive power.

* * *

Livestock on Rail

Greyhounds and racehorses in course of transit from one triumph to the next are treated with an exaggerated courtesy that irritates those not accustomed to putting their shirts upon these animals, or those who, having staked their shirts, find themselves deceived as to the creature's capabilities. Other livestock journeys without exciting much notice, although occasionally in these days cries of "herded like cattle" or—reminiscently—"hommes quarante, chevaux huit," arise in a crowded corridor. A correspondent who pays more than the usual superficial attention to animals *en route* deplores the thoughtlessness that sometimes causes crates of chickens to be deposited on the edges of platforms, where the inmates suffer a not unreasonable apprehension at the proximity of passing trains; and the slow transport of cattle in loose-coupled goods trains, often punctuated by periods of standstill during which the noise of nearby locomotives causes alarm. His first complaint is the one capable of the easier remedy, which may come automatically with the growing respect for poultry in an almost eggless world. As to the second, we would remind our correspondent that it is not long since a poet in our columns compared the lot of travelling cattle very favourably with that of the human passenger.

Privately-owned Wagons in Britain and U.S.A.

THE private ownership of railway wagons in this country has been a controversial subject for many years. No one, least of all the railway companies, denies the usefulness and value of the progress which has been made possible by the research and planning of many important railway users in the development of vehicles specially designed for their particular traffics. In numerous instances the railway managements have co-operated with the trader either in the design of the vehicle or in the supply of a special chassis to take the container supplied by the trader. There are numerous instances, too, where the volume or frequency of a special traffic is not sufficiently large to justify a railway company building vehicles of a kind required to transport it under the most favourable conditions, although it might well be that it would amply repay the trader consigning the traffic to have his own wagons so that movement could be ensured in the best possible way. In all these cases the privately-owned wagon serves a valuable—often a vital—purpose. Unfortunately, many of the 605,000 or so private wagons in this country do not come within any of the above categories, but are old 10-ton and even 8-ton coal wagons. These and their like are the private-owners' wagons which time and again have been condemned for the delay and cost they inflict on the railway companies but which have continued their separate existence largely because of the difficulties of devising an equitable scheme for taking them over and compensating the present owners.

For the duration of the war, of course, the problem of the privately-owned wagon does not obtrude, for the Minister of Transport has exercised his powers of requisition and has merged the wagons with the railway fleets. The only exceptions to the requisitioning order are certain categories of wagons used for special purposes and unsuitable for other use. Compensation is being paid the owners of the wagons on the basis of size and age, as was shown in detail in THE RAILWAY GAZETTE of June 7. In this way one of the drawbacks to the use of these private wagons in the last war has been overcome and the result has been that the total pool of wagons at the disposal of the railway companies has been of the greatest help in the times of heavy demand for freight vehicles through which we are now passing. The latest available analysis of the types and numbers of requisitioned privately-owned wagons in this country is as follows:—

Type	Carrying Capacity					Total
	8 tons	10 tons	12 tons	15 tons	20 tons and over	
End-doors	13,560	211,475	247,055	2,691	1,801	476,582
Side-doors	14,075	54,140	15,215	608	252	84,290
Hoppered bottom doors	66	1,496	1,718	368	6,461	10,109
Coke	337	4,846	5,371	232	528	11,314
Not described	76	944	423	—	51	1,494
Totals	28,114	272,901	269,782	3,899	9,093	583,789

In addition, there are some 21,000 privately-owned wagons which have not been requisitioned (excluding tank wagons) making a total of approximately 605,000. Similar details are not available in respect of railway-owned wagons. In the United States the Interstate Commerce Commission statistics show that in 1938 the following details applied to that country:—

Railway-Owned Freight Wagons		No. of Wagons
Class I railways, including switching and terminal companies ...		1,927,965
Class I railways		1,699,597
All steam railways		1,754,160
Privately-Owned Freight Wagons		
Total, all types		285,069
Refrigerator cars included in the above total		123,955

In the United States the specially-designed wagon has also achieved prominence, and possibly to a greater extent than on the British railway system, because of the greater distances falling within the boundaries of America, and the consequent variations in temperatures, the privately-owned freight wagon has been instrumental in exerting a considerable influence on the direction and development of various

important industries. In the September issue of the *Railroad Magazine* (U.S.A.) these wagons are the subject of treatment at some length and the conclusion is reached that through the years they have contributed much to the progress of the railways. There, of the 1,750,000 wagons, about 15 per cent., or 290,000, are privately owned. The author deals at great length with refrigerator cars, which number about 124,600 of 75 varieties. To a greater extent than in this country the wagon-hire business has been developed, for it would seem from the survey in the *Railroad Magazine* that by far the greater proportion of the private wagons is in the possession of corporations which specialise in letting the vehicles. This seems to be a remunerative business, for the owner receives payment from the hirer and also a rental from the railway based on the mileage travelled by the wagon. Out of this revenue he has to build the wagons, keep them in repair, and guarantee the effectiveness of the system of refrigeration installed; he has also to maintain icing stations, nowadays a much simpler matter than when refrigerator cars were first introduced some 75 years ago. Considerable ingenuity has been displayed in the designing of numerous other kinds of wagons for widely differing purposes—from conveying crude oil from the well to moving turkeys towards the Thanksgiving Day table. Of topical interest on this side of the Atlantic is a description of circus trains in which it is stated that the German Army studied these trains many years ago, and, with Teutonic thoroughness, adapted many of their practices to military use for the transport of field artillery and other wheeled vehicles.

* * * *

Industrial Capacity in the Empire

THE war effort of the Empire overseas, both in men and supplies, has been rapidly growing for many months, and has not yet reached its peak. It is already apparent, however, that one result which will have widespread repercussions after the war is the increase and development in the capacity for industrial production in countries which hitherto have been large buyers of British manufactured products. In Canada the Minister of Munitions & Supply announced last month that capital expenditure already planned on munition plants and equipment was about £50,000,000. These plants are expected to yield a yearly output of munitions valued at about £180,000,000. By the end of this year three large explosive plants will be in operation; a shell-filling plant is due to begin production next month. Plans have been completed for the construction of three plants for the manufacture of rifles, explosives, and anti-aircraft guns; and the first tanks will be produced in February. Similarly, in South Australia a large industrial centre is rapidly developing at Whyalla. It is already a shipping port of consequence for iron ore, and it is proposed to erect a steel mill at an estimated cost of £A2,000,000. The building of a £A150,000,000 blast furnace was begun last year. At Sydney plants have been built for the manufacture of shell-bodies and twenty-five pounder guns, and plans advanced for the production of tanks. At Melbourne, shipyards capable of building ships up to 12,000 tons are being erected. In India, a survey of sites for aircraft factories has been completed, and already one new factory has been established at Bangalore; a shipbuilding yard is planned at Vizagapatam. Recently it was announced that India would meet the present steel demands from the Middle East, Iraq, Kenya, and Uganda, and that a balance of 10,000 tons a month of untested light steel products and the same quantity of scrap would be available for Great Britain for the next twelve months. Arrangements have also been completed for supplying 300,000 tons of pig iron and foundry iron at the rate of 5,000 tons a month. It is significant that the iron and steel industry has increased its production since 1938-39 over 500,000 tons. The value of the help that the mother country is receiving from the Dominions overseas in the present struggle cannot be over-estimated. With the return of peace, however, it will obviously be necessary to envisage important and complex re-arrangements in what have hitherto been regarded as the normal flow of imperial commerce within the Empire. Sir Cecil M. Weir, an executive member

of the Export Council, Board of Trade, speaking at Lincoln on October 14, declared that the formation of about 270 export groups had given our commerce a new structure and the system had come to stay. It had been invented for wartime needs but he was convinced that it would be of inestimable benefit when the transference of manufacture from a wartime to a peacetime basis had to be carried out.

* * * *

Tanganyika Railways and Ports

THE railway system worked by the Government of Tanganyika Territory, of which we have received the annual report from Mr. R. E. Robins, the General Manager, consists of two separate sections, both of metre gauge, with no physical connection between them. The Central Line, 775 miles in length, runs from the port of Dar es Salaam inland to Lake Tanganyika, with two branches, one to Lake Victoria (235½ miles) and the other to Kinyangiri (93½ miles). The Northern Line, 272 miles in length, runs inland from Tanga, on the coast, to Moshi, and connects with the Kenya & Uganda Railway at Kahe. Ports and wharves on the coast and on the lakes are under the same administration as the railway, as well as the steamer services on Lake Tanganyika. As the ports and railways are operated under different forms of legislation and different methods of transport, and as only four ports are at present connected with the railway system, the finances of the two services have been separated in order to show to what extent the costs of each service are borne by its users. Revenue of the railway and steamer services failed in 1939 by £25,814 to meet working expenditure and debt charges, and the revenue of the port services failed, in the first year of separate operation, to meet the working expenditure and debt charges by £76. Figures in the accompanying table refer only to railway working except where otherwise stated:—

	1938	1939
Miles open	1,376	1,376
Passengers	499,603	469,899
Revenue goods (metric tons)	233,154	228,189
Ton-miles	44,167,822	45,208,677
Train-miles	646,006	640,057
Operating ratio, all services (per cent)	56.40	59.91
	£	£
Coaching revenue	117,536	107,766
Goods traffic revenue	445,373	453,666
Gross receipts, all services	662,556	712,642
Expenditure, all services	373,660	426,947
Net earnings, all services	288,896	285,695
Debt charges, all services	309,676	311,585
Net deficit	20,780	25,890

For the second year in succession the ground nut crop failed. At the outbreak of war, revenue was about £5,000 higher than the 1938 level and the savings on estimated expenditure were approximately £15,000. Shipping and other difficulties led to trade disturbance and though the saving on estimated expenditure amounted to £21,237 a deficit could not be avoided. Steam railcar services which have been regularly operated on the lower sections of the Tanga line have been popular with the public and have been making real contributions to net revenue after providing for loan charges, depreciation, etc. There are three Sentinel steam railcars now in use, and the service has been extended to the more thinly populated areas. A further decrease has to be recorded in transit traffic with the Belgian Congo, whereas transit traffic with Northern Rhodesia continues to show a small but steady increase. Results from the Man-yoni—Kinyangiri branch, though better than in 1928, continue to be disappointing. The average net freight train load for the whole of the system increased from 117 to 121.7 metric tons. There was a satisfactory reduction in engine-miles with an increase in ton-miles of public traffic. During the year a further innovation was the fixing of a permanent establishment of locomotive distribution throughout all sheds. It is regarded as a basis for providing fixed operating and maintenance staffs and maximum and minimum stocks of spare parts for the particular locomotives operating over the different sections. Oils and such other consumable stores can thus also be better controlled. The track has generally been maintained to a standard which still permits of good running at the maximum speed in force.

PUBLICATIONS RECEIVED

Portrait of a Colony: The Story of Natal. By Alan F. Hattersley. London: Cambridge University Press, Bentley House, Euston Road, N.W.1. 8½ in. × 5 in. × 1 in. 233 pp. Illustrated. Price 8s. 6d. net.—Mr. Hattersley has written a very readable account of the early history and development of Natal, with a sufficiency of local and personal detail within its proper social framework to provide an entertaining record of a typical phase of 19th century expansion. The early transport experiments of the colony provide interesting reading. Of the railway development it is recorded that in 1860 Durban boasted the smallest railway headquarters in the world. The line itself, which ran from the town to the port, was the first constructed in southern Africa. Its gauge was the standard 4 ft. 8½ in. of British lines; it was opened for traffic on June 26, 1860, a few months before the arrival of Prince Alfred. The royal midshipman was taken to the Point in what was described as a "special train," but as the entire rolling stock of the company consisted of two carriages, it

is probable that the "special" nature of the accommodation had reference merely to cleanliness and decoration. One of the carriages was furnished in oak and fitted with cane seats; the other was no more than a covered truck. The engine was gaily painted in green, with bright copper wheels and the word *Natal* in brass. The train ran three times daily each way. Its speed was slow, but its calm and stately progress was an advantage for those who wished to alight near their own homes without the formality of stopping the train. At Durban, the terminus and headquarters of the private company which owned the line, the entire staff consisted of the General Manager, Alexander McArthur, the engine driver, Davidson and a small boy, Austin, who collected the sixpenny fare during the journey. Later in the 'sixties, the Colonial Government constructed a single line of the same gauge, to convey stone for the harbour works from the quarry at Umgeni. The two lines formed a junction at the Durban station and the Umgeni branch was leased to the Natal

Railway Company under a contract which allowed the latter to use it for general traffic, in return for the conveyance of stone for the harbour at a nominal price. There is a good account of the later developments, including the opposition which was forthcoming from road transport interests, which were represented by the supporters of the mule-cart and ox-wagon and the horse-breeder.

Circuit Breakers.—The most modern forms of English Electric 33-kV and 66-kV oil circuit breakers for outdoor use are illustrated and described in an eight-page brochure, No. 947B, just issued by the company's publicity department at Stafford.

Back-Pressure Turbines.—A turbine without a low-pressure portion or condenser is a comparatively simple piece of machinery, and is widely used in process work, where it is common practice to expand steam in such a turbine to generate electrical power and then pass the exhaust steam to the processing machinery. Turbines of this pattern and some of their applications are covered in the new 20-page English Electric publication No. 530A.

THE SCRAP HEAP

The East Midlands Traffic Area Spit-fire Fund (contributed by bus and lorry owners) has made its third £1,000 contribution towards the purchase of aircraft.

BARRAGE BALLOONS STOP SWEDISH AIR SERVICE

A Swedish air line has had to suspend its foreign services to Berlin, Helsinki, and Moscow owing to the numbers of barrage balloons that have drifted over Sweden since October 5, says an Official German News Agency message from Stockholm.

In Montana a railroad bridge had been destroyed by fire. The bridge engineer and his staff were ordered in haste to the place. Two days later the superintendent arrived on the scene. "Bill," said the superintendent to the old master bridge builder, "I want this job rushed. Every hour's delay costs the company money. Have the plans for the new bridge been drawn yet?" "I dunno," said the bridge builder, "whether they's any picture been drawn yet or not; but the bridge is up and the trains is passin' over it."

"Master of Transportation! Once a significant but now an obsolete title; how many are there in the service today competent to bear it? Yet until we have Masters of Transportation and goodly number of them; until their voices are not only heard but heeded; until, in short, transportation again

comes into its own, we shall fall far short of making our railroads what they have been and may be again—chief among the servants of our industrial civilization."—From "Railroad Freight Transportation," by L. F. Loree.

CANADIAN SCHOOL ON WHEELS

A "school on wheels," constructed in the London (Ontario) car shops of the Canadian National Railways, has started on its way to the lumber districts of Northern Ontario where it will serve as a school for the children living along 150 miles of line serving these districts. The railway car, operated by the Ontario Department of Education, will make three-day stops at ten sidings in the school district it serves. The children, who almost all come from lumber areas, will go to the school and receive their lessons for a period of five weeks. The car has accommodation also for the schoolmaster and his wife and for five children.

THE EXPLOITS OF THE LATE LEONOR FRESNEL LOREE

"Outside of the railroad field, Mr. Loree's exploits were equally legendary. Visitors gaze in admiration at the Delaware & Hudson general offices on Albany's waterfront, often mistaking it for the State capitol; its elaborate Flemish architecture is to Mr. Loree's specifications. Best windfall for the popular press was his way of getting home from Europe at the outbreak of the

last world war when, stranded in France, he chartered a steamer in his own name and brought home 250 Americans with him."—From the "Railway Age."

SIX BUSINESS MEN RUN A RAILROAD FOR A DAY

The 16-mile, 2-ft. gauge Bridgton & Harrison Railroad in Maine has discovered a new form of revenue for off-days. Several Sundays ago six business men from Boston, Mass., and vicinity joined together and hired the line for \$60 with the understanding that they were to be permitted to operate locomotive No. 8 and a train by themselves to and from any point on the line. It is reported that the amateur railroaders operated on a somewhat "screwy" schedule, interrupting trips for such things as picking blueberries and trying out swimming holes. All interested parties were invited to ride without charge—and, it is rumoured, invited to help fire. The road also earned some non-operating revenue for the day. Donations totaling \$50 were collected for the purpose of making necessary repairs to locomotive No. 9, which is at present hors de combat.—From the "Railway Age," August 24, 1940.

MILES OF U.S.A. RAILWAY TRACKS

If all the railroad tracks in the United States were so laid out, they would form 133 parallel tracks between New York City and San Francisco.—A recent statement from the Association of American Railroads.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

BRAZIL

Expropriation of the Brazil Railway

After the expropriations of railway assets referred to in THE RAILWAY GAZETTE of May 10 (page 662), the President of the Republic has now signed another Decree incorporating in the patrimony of the Union the whole of the property, goodwill, and rights of the Brazilian Railway Company in national territory, together with those of its subsidiary companies, namely:—

Empresas de Armazens Frigoríficos
Southern Brazil Lumber & Colonization Company
Companhia Industrias Brasileiras de Papel
Brazil Land Cattle & Packing Company
Companhia Port of Pará
Companhia Estrada de Ferro São Paulo Rio Grande
Southern São Paulo Railway Company
Sorocabana Railway Company
Companhia Estrada de Ferro Norte do Paraná
Compagnie Auxiliaire de Chemins de Fer du Brésil
Compagnie Française du Port de Rio Grande do Sul,
and possibly also
Companhia Mogiana de Estradas de Ferro

The port and rail services mentioned above, together with those previously expropriated by the Government, will be directly under the Ministry of Transport and Public Works, but the administration of the other undertakings will be entrusted to a Superintendent selected by the President of the Republic and subordinate to the Ministry of Finance. This Superintendent will, in turn, nominate his own delegates to act as directors or managers, who will be held responsible for the finances of the other undertakings.

Valuation and Liquidation

The President of the Republic will also appoint a commission under the direction of the Superintendent to value all properties of the undertakings incorporated, after which the Minister of Finance is authorised to negotiate the friendly liquidation of any amounts legally due. In addition, the Superintendent will examine the amount of profits earned by the Brazil Railway Company, the Sorocabana Railway Company, Compagnie Française du Port de Rio Grande do Sul, and Compagnie Auxiliaire de Chemins de Fer du Brésil through the redemption of bonds of these last named at prices lower than those paid by the treasury and refund any amounts gained in this way. Colonel Luiz Carlos da Costa Netto has been appointed Superintendent of the Brazil Railway and subsidiary companies as from July 22.

Paulista Railway Forest Services Department

Further information contained in the Paulista Railway annual report for 1939 shows that its Forest Department plays an important part in the life of the railway, the administration of which may be congratulated on its foresight in this direction, especially now, at a time when so many overseas railways are beset with the difficulties attached to the coal shortage arising out of the

war. The capital account for this department stood at 15,917 contos and gross receipts to date totalled 30,558 contos.

Some 18,550,000 eucalyptus trees were planted in the 16 forests situated at different points on the line and already 1,757,209 cu. m. of firewood had been extracted from such trees apart from 1,274,866 cu. m. of other types. In addition a total of 225,652 props and posts had been forthcoming. A feature attached to such large plantings of eucalyptus, however, and one which was not generally known, was that apart from the uniformity of growth, the trees, with their tremendous capacity for absorbing moisture, were excellent for draining marshy lands where in many cases they have been known to eliminate *impalludismo* (malaria) and other tropical swamp diseases.

CANADA

Lignite Exploration in Northern Ontario

According to the Industrial Commissioner of Temiskaming & Northern Ontario, approximately 1,000 tons of lignite have been stripped of overbearing in the vast Northern Ontario field straddled by the Temiskaming & Northern Ontario Railway, 126 miles north of Cochrane, and are ready for exhaustive tests in the railway power plants. The potentialities of this low-grade coal deposit are being explored under the direction of the Ontario Government, in the hope that it may provide domestic fuel for Northern Ontario.

Recent drilling, the Commissioner said, revealed a considerable extension of the field. Already 8,000,000 tons have been blocked out over a 100-acre area. In addition, a large potential field lies to the west of the Onakawana river in the same area. In the main block, drilling showed an average overbearing of boulder clay and hard pan 50 ft. deep, with a coal layer beneath ranging in depth from 20 to 38 ft.

INDIA

Pilgrim Traffic on the Railways

Rai Bahadur N. C. Ghosh, Transport Advisory Officer to the Railway Board, recently addressed the Calcutta Rotary Club on "Pilgrim Traffic in India." Pilgrim centres, Mr. Ghosh said, were to be found all over India, from the Himalayas to Cape Comorin and from Karachi to Burma. After describing life at the great pilgrim resorts and at the periodical fairs that were held at these places, the speaker explained that before the advent of the railways a pilgrimage was attended with great risk to life and property. Railways had removed all such hazards. Though the usual equipment of a railway was sufficient to deal with normal traffic to

and from pilgrim centres, Mr. Ghosh explained that it was on special occasions when large numbers of pilgrims congregated at particular religious centres that the resources of the railways were overtaxed. Almost every railway now had a special organisation for the efficient handling of exceptional pilgrim traffic and for the encouragement of such traffic by proper publicity.

Railway Rates

The proposal of the railways to raise the railway freight on sugar from the Bihar and United Provinces factories by 12½ per cent. has provoked strong criticism from commercial bodies. It has been represented to the Railway Board that the sugar industry this year has a very large surplus production. The manufacturing costs have been high on account of the high price of cane fixed by the Governments of Bihar and the United Provinces. Railway freights are already subject to a supplementary charge of 12½ per cent., in force since March 1. If the freight rates are further increased, the disposal of the surplus will be practically impossible. It is also pointed out that the industry is at the moment in a critical position which will be greatly aggravated if the burden of freight is increased.

HOLLAND

The Netherlands Railways in 1939

The working and financial results of the Netherlands Railways during 1939 were on the whole satisfactory. Traffics improved slightly between January 1 and May 25 of that year, but on and from the latter date, when unauthorised goods and passenger road traffic became illegal—a form of competition which had caused the railways to lose some 8,000,000 florins annually—a very considerable rise in earnings was manifest, despite a reduction in railway rates and fares.

But this boom was short-lived, as the outbreak of war caused a sudden drop in receipts of about 25 per cent. in September. An upward swing of the financial pendulum began on October 15, however, and continued until the end of the year. State compensation to the railways during the period of mobilisation and important additional receipts from military traffic, improved the financial position during this period.

The following are some of the more important figures for the year as compared with those for 1938:—

	1938 Million florins	1939 Million florins
Passenger receipts	55.5	61.7
Goods	38.6	42.9
Miscellaneous	6.9	6.4
Total	101.0	111.0
Operating expenditure	88.6	88.6
Net revenue	12.4	22.4

Depreciation and debt service, however, amounted to 39.9 millions, so that there was a final adverse balance of 17.5 millions, as compared with 23.3 millions in 1938. The State makes good such deficits.

ELECTRIC TRACTION SECTION

When the Balloons Go Up

UP to date from the outbreak of war experience has shown that the electrification of railways has been an advantage to the countries that have extensive electrified mileages, rather than, as had been so widely predicted, a source of danger to them. Italy in particular has scored heavily by her enterprise in electrifying most of her important main lines, for shortage of coal would otherwise have necessitated a very severe curtailment of train services. Switzerland also has felt the benefit of electrification for the same reason, and no doubt the considerable electrified mileages in France, Holland, Sweden, and Germany have been an important asset to the peoples served by them at a time when coal or its transport may have been in short supply. As we have previously pointed out, military operations in this war have not succeeded in immobilising electric railways any more severely than steam railways; but a completely unforeseen risk of electrification, especially where overhead conductors are used, has lately been experienced, and Sweden, from all reports, appears to have suffered worst on this account. Recently the south-westerly gales which are always experienced in autumn in England have caused some of the barrage balloons, flown over vulnerable targets in this country to prevent dive-bombing, to break loose, and they have drifted for great distances, their trailing steel cables doing widespread damage in their travels. It has been reported that on two occasions considerable dislocation of traffic has been caused on the electric railways of Sweden by the cables short-circuiting the conductors. This is a matter of mutual disadvantage to ourselves and to a neutral country. We suffer from the loss of the balloons; the Swedes suffer from their reception.

Sorocabana Railway Electrification

THE Electrical Export Corporation, an American undertaking formed by the U.S. General Electric and the Westinghouse Companies, and the Cia. de Mineracao e Metalurgia Brasil "Cobrasil," which presented a joint tender, has been awarded a contract for the electrification of part of the Sorocabana Railway in Brazil, as foreshadowed in the *Electric Traction Supplement* for January 26. The contract is valued at about £1,250,000 and involves the electrification of about 330 km. (205 miles) of metre-gauge track and the provision of three converter substations, track sectioning cabins, 20 locomotives, and four 3-car multiple train units. As described in our *Electric Traction Supplement* of June 21 last (p. 68) the scheme comprises a double line of metre gauge 140 km. (87 miles) long between Sao Paulo and San Antonio via Sorocaba. There was keen international competition for the contract and four groups submitted tenders. One from an Italian consortium was disqualified on technical grounds. The successful bid was at \$6,679,493 (about £1,669,873) plus 19,744 contos, making a total of about 153,000 contos. The English Electric Co. Ltd. quoted for alternative equipment; its tenders were £1,216,211 plus 27,920 contos, a total of some 113,000 contos, and £1,124,211 plus 27,710 contos, totalling about 106,000 contos. Metropolitan-Vickers Electrical Export Co. Ltd. put in a quotation for £1,522,930, plus 11,387 contos, or about 117,000 contos in all; alternatively, if concrete were used for poles instead of steel, £1,357,990, plus 15,522 contos, totalling about 110,000 contos. The Electrical Export Corporation offered to take payment in six-monthly instalments spread over ten years for dollars, and over five years for currency. The English Electric Co. Ltd. stipulated that prices would be subject to confirmation. The tender by the Metropolitan-Vickers Electrical Export Co. Ltd. gave firm prices, with monthly payments over five years on a similar basis to those established in the case of the electrification of the Central Railway. There can be little doubt that success in the securing of this contract was largely a matter of the terms which could

be offered for the financing of the work and in this connection the American undertaking was able to offer much more attractive facilities than the British concerns, although the tender price was higher. But it must be recognised also that British manufacturers could scarcely offer attractive guarantees as to the date of completion of the work. A ten-year spread of payment could hardly be expected to commend itself to the British authorities at the present time, whereas the United States is in a better position to accept the risks inevitable in so long-term a contract. It has been strongly held for some time in quarters intimately connected with our export trade that an essential factor in the expansion of that trade is the granting of facilities for protracted payments, and that some scheme should be devised to enable our exporters to work on a more competitive basis with overseas tenderers. In connection with the present contract it has been stated that the committee which examined the tenders was influenced by the methods of payment proposed by the Electrical Export Corporation and also by the fact that a constituent firm of the corporation had previously electrified a section of the Paulista Railway. As to the latter aspect, it might equally well be pointed out that the first stage of the Central Railway of Brazil conversion was carried out by the Metropolitan-Vickers Electrical Co. Ltd. and has been operating successfully for two years, and as emphasised in the *Electric Traction Supplement* of January 26 there was no reason to suppose that the second stage would not be carried out by Metro-Vick in accordance with the original proposals.

Electrification in Chile

THE general electrification of Chile by harnessing all available energy in the principal rivers for the supply of cheap power to numerous industries, railways and towns, is reported to have received official support by the decision of the Trade Development Corporation to spend 133,000,000 pesos on a hydro-electric plant on the River Cachapoal, 80 miles south of Santiago, the capital. The new plant, which will be one of the largest in South America, will supply 85,000 kW to Rancagua and Santiago for delivery by subsidiary companies to industrial consumers and to the Chilean State Railways for the electrification of the 5 ft. 6 in. gauge branch from Santiago to the port of San Antonio. This will be a continuation of the 3,000-volt d.c. electrification between Valparaiso and Santiago, 116 miles, which has been in service since 1924. Other large hydro-electric power plants are contemplated, including one at Huilo-Huilo, near Valdivia, which is intended to supply the southern provinces. It is also proposed eventually to electrify the main line southwards of Santiago to Puerto Mott.

South African Electrification

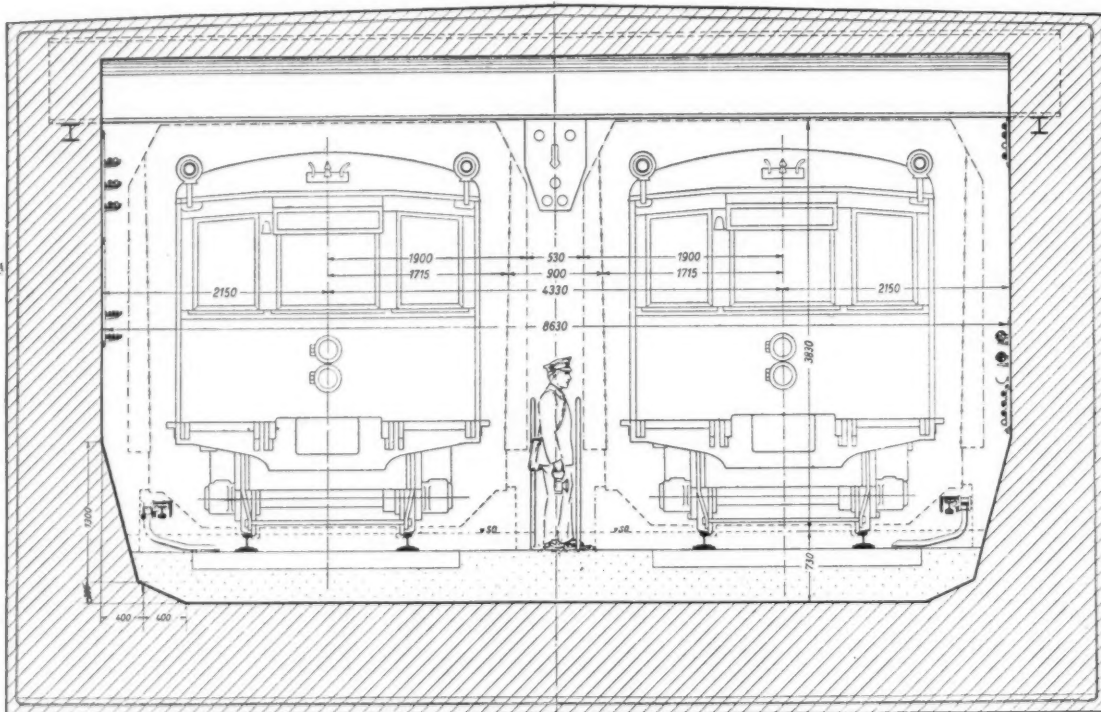
THE South African Railways & Harbours system now has electrified 605 route miles, equivalent to 1,232 track miles, all of it direct current. Apart from the 1,500-volt Cape-town suburban lines, a tension of 3,000 volts is used, and the routes electrified on this system are grouped in two districts, viz. Natal and the Reef. According to the annual report of the South African Electricity Supply Commission, the railways consumed 361,905,545 kWh. for traction purposes during 1939, this being an increase of 17 per cent. over the figure for 1938. The railway load formed a little over 10 per cent. of the total electricity consumption in the Union. Of the railway load, approximately 89½ million kWh. were taken by the Reef lines and 219½ million kWh. by the Natal lines; the remaining 53 million units were taken by the Capetown suburban system. Conversion of the Rossburgh-Hillcrest line near Durban was under way in 1939, but is now in abeyance owing to prevailing conditions. Increased traffic on the Reef led the railway administration to request the Supply Commission to provide five new traction substations, but these are not yet in operation.

COMPLETION OF THE BERLIN NORD-SÜDBAHN—II

Some details of the electrical and civil engineering works on this new Berlin underground section of the Reichsbahn, which gives through connection between the northern and southern suburban lines of the city

IN our Electric Traction Section of September 20 we described the origin and geography of the new Berlin North-South line (Nord-Südbahn) which was completed on October 8, 1939. It may be recalled that this new link across the city connects the Stettiner terminus in the north with the Potsdamer and Anhalter main-line terminal stations in the

power frames at stations where points have to be operated, and automatic train stops. The signal indications are the same as those adopted when the City line was electrified, the permissive stop indication being two yellow lights side by side. The signals depend from the roof between the tracks.



Typical cross-section through the North-South line tunnel showing clear footway between tracks, and standard signal position above it

south, and provides through running for electric trains serving the northern and southern suburbs.

The length of the new tunnel section is 3.6 miles. It has been constructed largely on the cut and cover system and for the most part not very far below street level, with a clear height of 12 ft. 6 in. and width of 28 ft. 5 in. for double track, giving a safe way for employees between trains. There are no central supports, except where they are unavoidable. About 37 per cent. of the whole line is straight. The maximum gradient is 1 in 30 and the minimum curvature 495 ft. radius, with maximum superelevation of 6 in. The stations are handsomely finished in tiling and provided with escalators in the majority of cases. The platforms are level with the train footboards and 528 ft. long. The new station buildings, especially at the Stettiner, Humboldthain and Bornholm stations—the last two were opened in 1935, while the services were still using the original Stettiner terminus—are of modern style and of pleasing appearance, the concourses, booking halls and other parts being spacious and well arranged. All stations carry the letter "S" for "Stadtbahn" (City Railway) to distinguish them from the "U" stations of the Berlin Transport Company's underground lines.

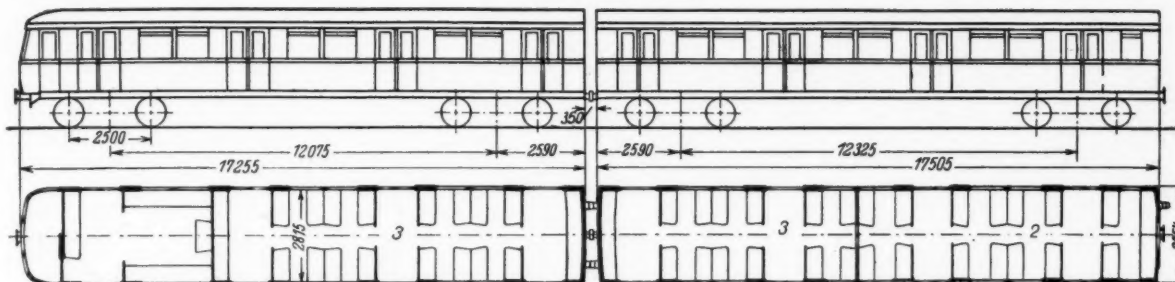
Automatic 3-aspect signalling has been installed, with

The latest rolling stock is of similar general type to that adopted for the City line and other electrified suburban lines, improved in numerous details and providing second and third classes. A complete train consists of 8 two-car sets, each composed of motor coach and trailer, with all-steel welded bodies, welded bogie frames, Scharfenberg coupling gear and additional shock-absorbing buffers to promote steady running. The hydraulic anti-oscillation gear formerly used has not been continued. The fronts of the sets are slightly streamlined.

Aluminium alloy has been largely used for door and window frames and internal fittings. Inside dimensions have been somewhat increased over previous practice, allowing of more comfortable seating in the second class. Experiments with strip lighting not proving satisfactory, opal cap lamp fittings have been adopted, with all lights in parallel on a 48-volt circuit fed from a motor-generator set with accumulator standby. If the traction supply to the motor generator is interrupted for more than a certain length of time, half the lights are automatically switched off to ease the load on the cells. Destination indicators consist of electrically illuminated opal screens.

Braking is by compressed air, variable with the load and

Electric Traction Section

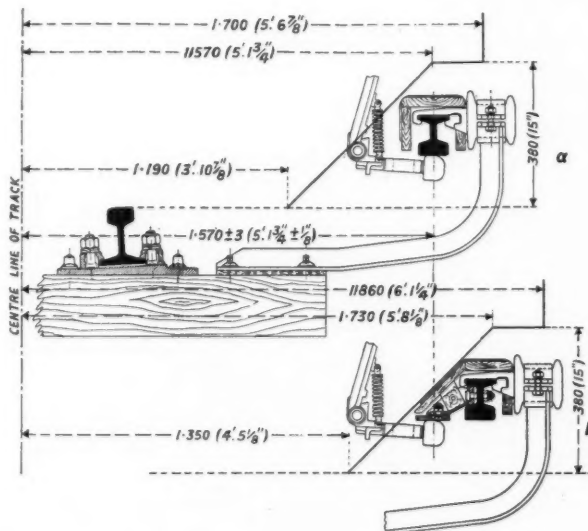


Latest type of two-coach motor and trailer set as used on the Berlin City electric lines ; many of these were built for the operation of the North-South line

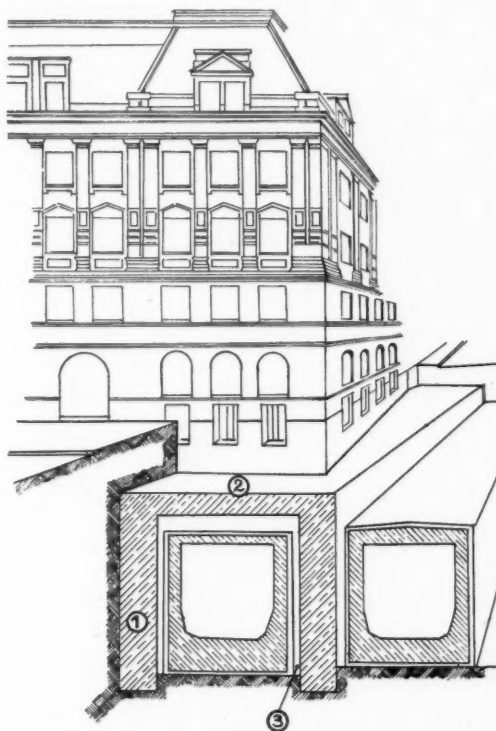
centrifugal governing to prevent locking of wheels at the lower speeds. Heating is electric, controlled by three thermostats in each coach, two outside, to detect the external conditions, and one inside, the arrangement being specially designed to meet the case of frequent stops and maximum opening of doors in winter weather. All doors are air-closed by the guard. Fan ventilation is installed. Multiple-unit control is of the camshaft type, but the main and reversing switches are operated electromagnetically and not by air as in the earlier City line stock. All new trains are identical, save that some which are to run on the longer suburban routes are motored to reach a maximum speed of 120 km.p.h. (74.5 m.p.h.) instead of 80 km.p.h. (50 m.p.h.).

Traction is by third rail with under-running contact shoes at 800 volts, a 30,000-volt 3-phase 50-cycle supply being taken from the Berlin electric power stations and the Reich grid system at two points, Markgrafendamm and Halensee switch chambers, whence it is fed to unattended substations, each containing four rectifier sets of 2,400 kW continuous rating, with protective grid, built above ground level at the Stettiner and Anhalter stations and remotely controlled from the nearest attended substation. The capacity provides for 40 8-car trains an hour on each track, and the dividing point between the two areas is at Unter den Linden, the northern limit being Humboldtthain and the southern Kolonnenstrasse. The installation of rectifiers at every station, as on the City lines, was not practicable.

Very complete precautions have been taken in arranging the distribution cables to avoid a total failure of power.



Arrangement of under-contact conductor rail on the North-South line showing (below) the type of bracket offset used on sharp curves. The standard type of German f.-b. track is also shown

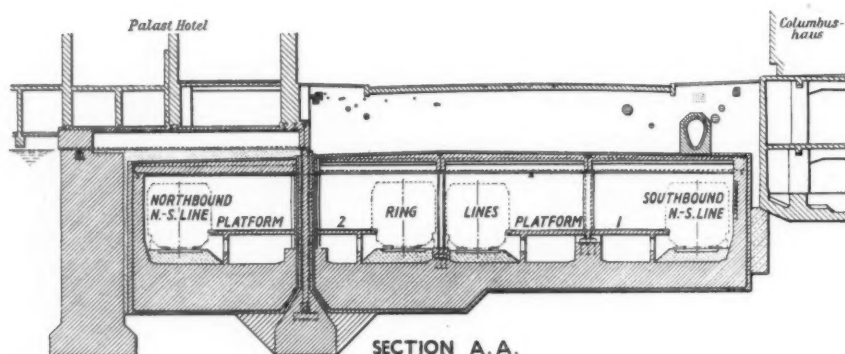
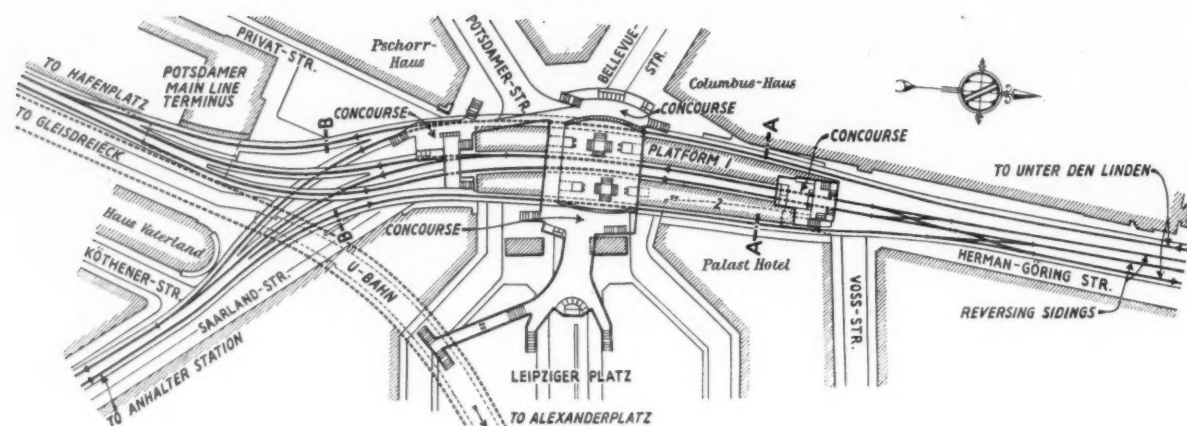


Method of insulating new tunnels from existing buildings to prevent the transmission of vibration. (1) indicates the surrounding walls, (2) the supporting deck, and (3) the insulating space

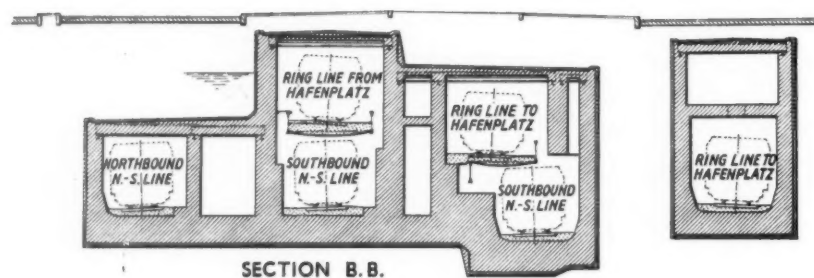
Battery standby is provided for escalators, station and emergency lighting, with special connections to an alternative house lighting supply. The rotary converter sets in the older suburban section substations have been replaced by rectifiers, making the largest rectifier traction installation in the world. The third rail is of Armco iron, which has a very small carbon content and an appreciably higher conductivity than mild steel. On the 495-ft. radius curves the rail itself does not provide the actual collecting surface, which is given by a special section of angle iron bolted to its inner face, to provide the necessary clearance.

The civil engineering work has been difficult on numerous parts of the route, especially in the centre of the city, where many heavy buildings had to be underpinned, while large numbers of mains and cable routes of all kinds have had to be diverted.

Much of the ground traversed is waterbearing sand, and the water level had to be reduced by pumping until the subsoil was dry right down to the foundations of the new tunnels which were completely waterproofed before the pumps were



Plan and cross-sections of the new Potsdamer Platz underground station of the North-South line, showing entrances from street and interchange passage with the Berlin Transport U-Bahn station



stopped. Where the line runs under large buildings the tunnels were insulated to avoid vibration.

The total cost of the line is given as 173 million marks, divided as follows:—

	RM. millions
Tunnelling and other civil engineering works	81.7
General and administrative costs	18.3
Buildings and reconstruction of stations	11.6
Purchase of ground and compensation	11.6
Electrical cables and wiring	15.0
Rolling stock	10.1
Alterations to existing cables, pipes, etc.	8.9
Signalling and telephones	8.3
Permanent way	4.8
Conveyance of materials...	2.7

The work was carried out to plans prepared by the Berlin

Divisional Management of the Reichsbahn; it is estimated to have given employment to about 11,000 persons altogether. A few only of the most experienced firms were employed on the civil engineering works. The formal opening ceremony of the southern half was performed on October 8, 1939, by Dr. J. Dörpmüller, Reich Minister of Transport, and the public service began next day. In his address he pointed out that 19 men had lost their lives in the course of the work. Considerable re-arrangement of lines had to be carried out by 600 permanent way staff to make the changeover for the Wannsee local services to run to the new route. For a short time the trains from Lichterfelde Ost and Mahlow continued to run to the old termini. The time on several of the most frequently made journeys has been reduced by about 50 per cent. by the new facilities.

NEW ZEALAND ELECTRIFICATION.—Change-over from steam to electric traction on the Wellington—Paekakariki main-line section is now being made gradually, and since July certain of the principal expresses have been hauled by the English Electric type of 1-Do-1 locomotive. Trains of 15 passenger cars have also been hauled by these electric locomotives.

MELBOURNE UNDERGROUND PROPOSALS.—The City Council of Melbourne has again asked the Railway Department of the State of Victoria to construct an underground line to relieve congestion in the northern part of the city. Earlier schemes comprised a line from the Jolimont yards to Peel Street, with three or four stations.

NOVEL BRIDGE LENGTHENING IN AMERICA

A 1,200-ft. simple truss span bridge was lengthened to 1,920-ft. by inserting a 720-ft. cantilever structure; the main cellular caisson piers and their sinking are of unusual interest

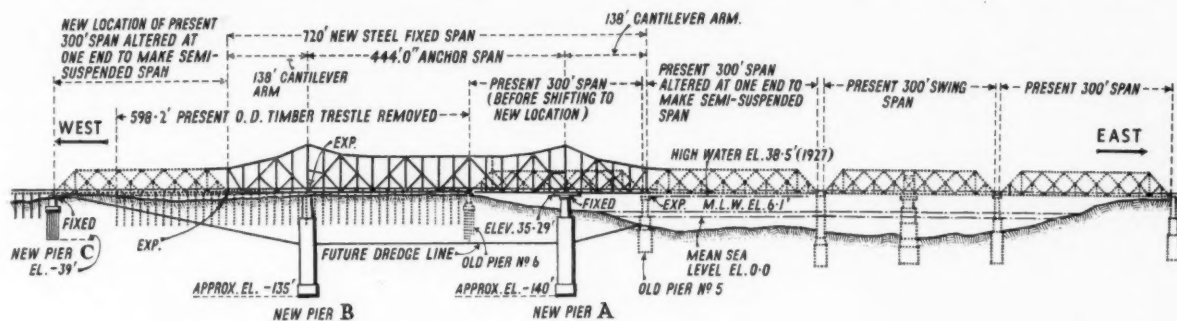


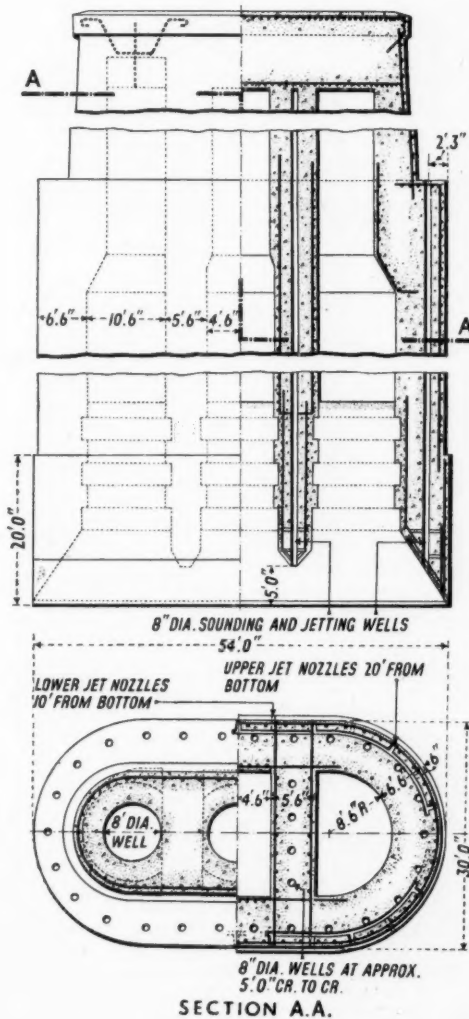
Diagram showing the method of lengthening the bridge by moving the existing western 300-ft. span 720 ft. westwards and by inserting a 720-ft. cantilever structure

IN connection with the Federal flood control on the Lower Mississippi, the Atchafalaya river had to be widened, and where the Missouri Pacific Railroad crosses it at Krotz Springs, the bridge had to be lengthened from 1,200 ft. to 1,920 ft. The original bridge consisted of a central 300-ft. swing span and two 300-ft. fixed spans, one on each side of the river, a third similar 300-ft. fixed span was subsequently added; all these spans were of the through truss pattern. Two estimates were prepared for the lengthening now carried out (1) by adding two new 300-ft. spans on deeper piers, involving the replacement of one of the old piers, and (2) by building into the bridge a new 720-ft. cantilever structure and suspending two of the existing fixed spans from the ends of the new cantilever arms, a scheme that necessitated the moving of the most westerly 300-ft. span a distance of 720 ft. further westwards and the sinking of two deep open caisson piers of an unusual type. Yet the second alternative estimate proved 15 per cent. lower in cost, and the work it involved was fraught with considerably less risk. It should be noted that all work had to be done without serious interruption to traffic; the longest time available for rolling in and out the spans was 9 hr., and this was only slightly exceeded.

The panels of the new cantilever structure were so arranged that a 300-ft. length of it could be erected alongside the old westerly 300-ft. span (which had to be shifted) and rolled transversely into place while the old span was rolled out. The new structure was then extended westwards from this rolled-in portion over the new river channel, which had not then been dredged out. The track meanwhile was diverted through an opening left in the northern truss of the central or anchor arm of the cantilever structure, and traffic carried over this diversion until the extension of the bridge was ready for reopening.

Alignment of Cellular Caisson Piers by Air Jets

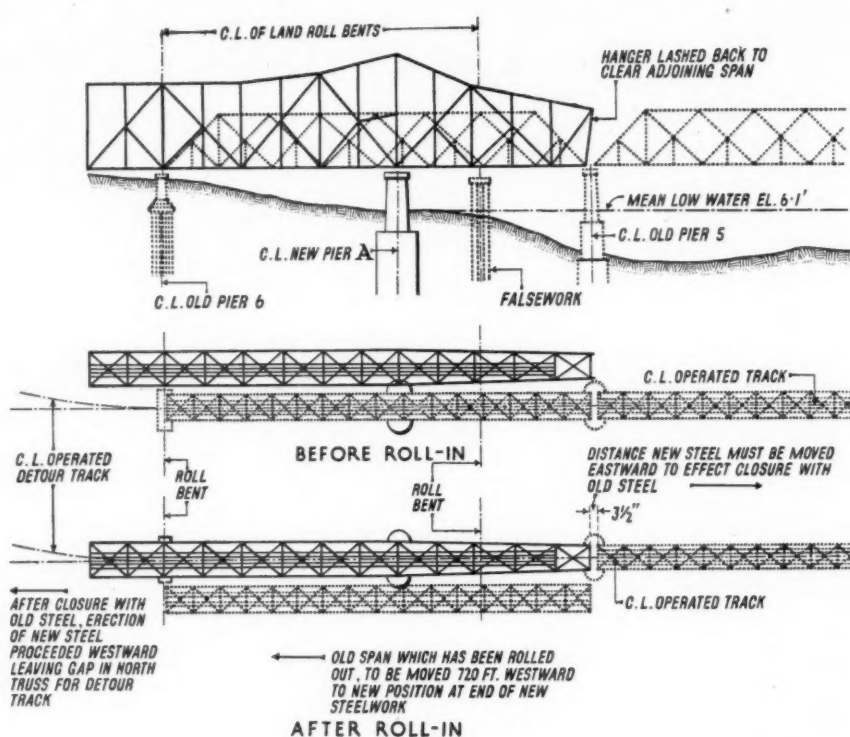
The two piers to support the cantilever structure are founded on caissons, but as the ground had not been dredged prior to their construction, the caissons and piers were sunk by dredging as integral cellular caisson pier units, with triple wells extending from the curbs up through the piers as dredging shafts. The dredging of the two outer wells was thus able to proceed without interference from the spans over the centre shafts. The outer wells in the caissons are D-shaped, and the centre one square in section, but the corresponding pier shafts are circular, 8 ft. in internal diameter. To guide, straighten and maintain in position the caissons, 8-in. sounding wells were provided at close intervals round the outer



Elevation and section of one of the caisson piers. Note the 8-in. sounding and jetting wells

caisson walls and in the cross walls, with two series of horizontal jets, one 10 ft. and the other 20 ft. from the bottoms of the sounding wells. Compressed air forced through certain of these jets at any time during sinking corrected tendencies to list or tilt. Sinking was effected in the usual manner by alternately dredging and building up the caissons and piers as kentledge. The sinking was carried on until the well curbs were 170 ft. and 175 ft. —at which depths stability was assured—below final pier caps, and yet the eccentricities of piers proved to be only 6 in. and 9½ in. respectively, thanks to the corrective measures mentioned above. We are indebted to our American contemporary the *Engineering News-Record* for these details and for the diagrams reproduced.

Right: Diagrams showing method of rolling out the old span and of rolling in part of the cantilever structure. The alignment of the track diversion is also shown



SIGNAL WIRING AND CABLING IN INDIA

WITHIN recent years the increased use of modern signal equipment has brought into considerable prominence the important matter of apparatus housing, wiring, and cables, some particulars of which were given recently in the columns of the *Indian & Eastern Engineer* in an article by Mr. H. C. Towers, Signal Engineer of the metre-gauge lines of the Bombay, Baroda & Central India Railway, a well-known writer on signalling topics who has contributed to our own columns from time to time. We are indebted to our Indian contemporary for certain of the information contained in the following notes.

Battery and Relay Accommodation

In earlier years when—as is still necessary in many places—primary cells were relied on as the sole source of power, the gradual adoption of various electrical safety adjuncts resulted in a heterogeneous collection of battery boxes and cupboards springing up underneath a signal box. The basement of a box is already sufficiently congested with such equipment as rods, wires, wheels, and cranks, and linemen attending to batteries have often to work amid awkward and inconvenient surroundings, which is not conducive to satisfactory maintenance. The B.B. & C.I.R. has found that great improvement results from the provision of a brick cubicle in which all the cells are housed alongside the signal box. It may be a completely isolated structure or built against a wall. The foundation is of concrete, over rammed stone, and is wide enough to afford standing room in front. The roof is either of concrete reinforced with galvanised iron wire or of corrugated asbestos. Door frames, doors and shelves are of hardwood, but door panels may be ply or asbestos sheet. Ventilation holes, for escape of gases, are gauze-covered to keep insects out. In such a structure cells remain cool in hot weather. Each cell has a painted serial number, so that labels can be fixed over batteries describing each group. A chart or schedule can be fixed inside for the lineman's guidance. Where one voltage is used the series-parallel arrangement is followed, as this facilitates cleaning and inspection.

Similar cubicles have been found suitable for housing relays and terminals. In many installations separate cases have been used for each relay or other piece of apparatus, a practice which, though sound, results in a large number of cases being required in some places. The cubicle is the cheaper method in such instances, and the opening of one door, enabling the whole of the equipment to be seen, is of much importance for rapid tracing of faults. In addition, the person making the test is sheltered from rain, as is also the apparatus.

Wiring for Power Signalling

In power boxes relays are now usually stood on open shelves; the racks are arranged around an opening in the relay room ceiling, coinciding with the power frame, so as to provide access to wires; a platform enables the maintenance staff to reach the terminals, etc. Inside the frame the open type of wiring is now preferred. Location and fixing of fuses depends on the type and position of the cable entry.

In India armoured cable has been found most suitable out of doors, as lead-covered cable run on brackets is liable to damage by trespassers or the removal of the lead sheath by thieves. Originally cables were run underground, but because of the heavy rains and floods in the monsoon on the West Coast and elsewhere, electrolysis and other adverse conditions led to rapid deterioration. Up-country, cables have been less affected, presumably because of sandy soil and small rainfall. Compound rubber insulated, filled, armoured cable, run on short posts appears the best, with lead sheathed armoured cable run in concrete troughing between sleepers, to pass under tracks, with a disconnection box at each end of the length. Defective lengths can thus easily be changed.

Vibration, flooding and disturbance by permanent way men may do damage to track-circuit connections, and a good arrangement is to instal a small disconnection box on a concrete foundation, between the rails at sleeper level, running a two-core armoured lead-sheathed cable from it to a disconnection box in the cables alongside the track where terminals provide the junction point between cable conductors.

and the leads to the rails, which are compound rubber insulated wire, run through pipe screwed into the side of the box. Thus the connections most susceptible to damage or deterioration can be renewed without affecting the main cable.

The best pole-line termination has been found to be

armoured cable run to the pole top with cores freed from the armouring there, heavily taped and soldered to the line wires, the point where the armouring ceases being sealed. This is neater than a collection of individual wires running through pipes or trunking, and it occupies little space.

BRIDGE DEMOLITION BY LIFTING

An expeditious method of demolishing a masonry arch bridge by lifting on the Great Western Railway

AN elliptical masonry arch bridge of 24-ft. span, with a width between parapets of 29 ft., and constructed in 1846, carried a public road at Mountain Ash over the River Cynon on the Aberdare branch of the Cardiff Valleys division of the Great Western Railway. Owing to colliery

and the final stripping of the arch was begun. By 6.0 o'clock next morning the backing had been removed. The gas and water mains were then disconnected, the steam cranes placed in position, the service girder unloaded, and sleepers laid to protect the permanent way. At 8.5 p.m. the girder



Arch stripped down to the service mains; trucks beneath to receive debris



Arch entirely stripped and service girder being lifted towards the crown of the structure



The moment of collapse. The girder has been lifted through and the masonry is crashing to earth



The resultant debris fallen on to the permanent way, which has been previously protected by sleepers

workings under the structure, it was decided to rebuild it to avoid risk of collapse. The design of the new structure provided for a series of longitudinal girders carrying a reinforced concrete slab floor.

The programme of reconstruction had to be carried out with the very minimum of interruption of both road and rail traffic, and it was found that, by the use of a steam crane on each side of the arch, slinging a service girder to lift the crown of the arch until it collapsed, occupation would be reduced to the shortest possible time on a Sunday.

The preliminary work consisted of removing the parapets and half of the roadway. At 11 p.m. on Saturday, July 13, complete possession of the road and railway was obtained,

was lifted by the cranes, and after the application of a pressure of approximately 30 tons, 75 tons of masonry fell on to the line. The arch failed first at the crown, then at the quarterings, and finally at the springings.

After demolition the girders for half the new structure were erected on bedstones already built on the abutments behind the springings of the old arch. Gas and water mains were reinstated, and put into service during the afternoon, concrete slabs were laid on the girders, and tar macadam spread and rolled ready for the passage of road traffic on Sunday evening. The debris on the permanent way was loaded up during the erection of the new bridge, and the line opened for trains by 10 o'clock the same night.

AXLE STRESSES—II*

A study of the bending moments in carrying and driving axles of locomotives and rolling stock

By GEORGE W. McARD

Locomotive Straight Axles

(a) *Main Driving Axles.*—In this case the stress on the axle is produced as the result of the static load on the bearings combined with the various loads due to the steam pressure acting on the two pistons. Owing to the changing position of pistons and cranks a variety of conditions naturally arises, but the most severe—apart from shock loadings set up when rotation of the wheels is

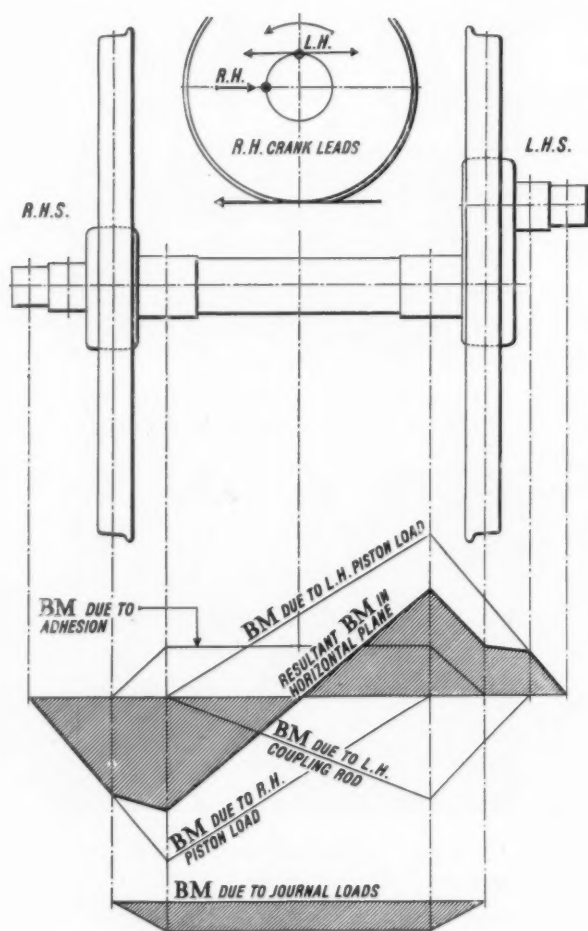


Fig. 6.—Diagram of bending moments found in straight driving axles

suddenly arrested by sanding or when traversing crossings and points at speed—are shown in the diagram of cranks on Fig. 6. No difficulty should be experienced in reading this figure, and after determining the resultant bending moment (by combining the BMs in the vertical and horizontal planes) this may be linked up with the torsional

load which is set up by the left-hand crank torque. Let R , P , and N represent respectively the crank radius (in inches), the maximum steam pressure on the piston (in tons), and the number of coupled axles. Then PR/N will be the normal torque absorbed in this axle since there is none passing from the right-hand crank, and half of this amount is at once taken up in the left-hand wheel; the remainder, $0.5PR/N$, is, therefore, the torsion TM passing through the axle.

A more severe loading, so far as the twisting moment is concerned, would be based on the amount of torque which might be transmitted through this axle assuming it to take an increased torque to compensate for defective adhesion at the treads of the other coupled wheels. In this case, with W_r and R_w representing respectively the

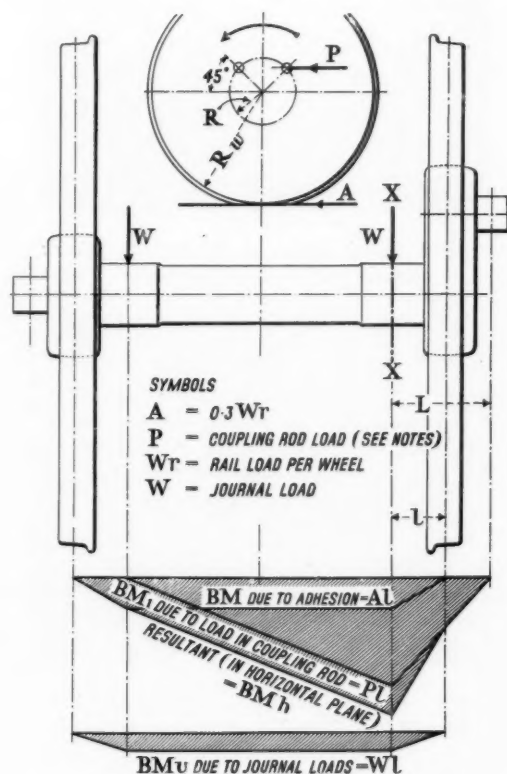


Fig. 7.—Diagram of bending moments found in steam locomotive coupled axles

load at the rail for each coupled wheel (in tons) and the radius of the wheel (in inches) we have the torque through the axle of an amount equal to the maximum adhesion which the R.H. wheel can offer, or $0.3W_rR_w$, and it is preferable to adopt this value for TM instead of that due to the steam pressure acting through the crank.

The equivalent TM_e is obtained from the formula $BM_r + \sqrt{(BM_r)^2 + (TM)^2}$, and this will equal the modulus

* The first instalment appeared in our issue of September 27

of the section (for twisting) times the stress, or Zf . Equating the two we get $Zf = BM_r + \sqrt{(BM_r)^2 + (TM)^2}$ and $f = BM_r + \sqrt{(BM_r)^2 + (TM)^2} / Z$. It will be observed that no account is taken of the loading due to the brake forces; these have been deliberately omitted as the piston loads are so much in excess. In this and all steam locomotive driving axles considered the engine is assumed to be a simple, *i.e.*, non-compound, but corrections can easily be made where the axles in question are for a compound locomotive.

(b) *Coupled Axles (i.e., non-driving)*.—This axle has precisely similar forces operating through it as the driving axle (a) above except that in place of the piston load that coming through the coupling rod on one side only must be considered. The actual force to be allowed for will be in excess of that normally transmitted through the coupling rods, and will be such as would slip the axle with the cranks at 45 deg. to the horizontal. In this position assume that the crankpin which is rising from the dead centre is taking the drive, and that with a crank arm of radius R and a force in the rod P the product of these will be equal in amount to the wheel radius R_w times the load at the rail per wheel W , multiplied by the factor of adhesion 0.3 at slipping. But the effective crank arm at 45 deg. is equal only to $0.707R$ and the load trans-

mitted by the coupling rod may be high enough to slip both wheels, or $2W_r$, and

$$0.707RP = 2R_w \times 0.3W_r \text{ and } P = 0.6R_w W_r / 0.707R$$

The forces acting on this axle may now be summarised as follows:—

- (1) BM_1 , due to direct bending as the result of the load P acting at arm L (see Fig. 7).
- (2) BM_2 , due to adhesion.
- (3) BM_v , due to static loading of journals.
- (4) TM , due to torsion. As half of this is taken up in each wheel, the remainder only will be the amount passing along the axle from wheel to wheel, or $0.5 (0.707 RP) = 0.3535 RP$.

BM diagrams are given for Nos. (1), (2), and (3), the first two being added together since both act in the horizontal plane and in the same direction, and afterwards combined with the third to give BM_r , the resultant. The torsional value is then combined with BM_r and the result, the equivalent TM_e , equated with the product of the section modulus and the stress. Thus,

$$BM_r = \sqrt{(BM_1 + BM_2)^2 + (BM_v)^2}$$

$$TM_e = BM_r + \sqrt{(BM_r)^2 + (TM)^2}$$

$$= Zf \text{ (where } Z = \text{torsional modulus)}$$

$$\text{and } f = TM_e / Z.$$

Bending moment diagrams are shown in Fig. 7.

(To be continued)

PECULIAR RESULT OF A U.S.A. ACCIDENT



A 75-car fast freight train on the Baltimore & Ohio Railroad was proceeding eastwards along the old main line between Point of Rocks and Baltimore, when, near Sykesville, the locomotive became derailed and plunged down the bank of the Patapsco river, together with 23 of the cars. The brakeman and the two enginemen were killed



A view taken on November 11, 1938, of the Potsdamer Platz, Berlin, during the construction of the new Underground station of the North-South line. The view is looking northwards up Herman-Göring street. The Potsdamer terminus, which was bombed by the R.A.F. on September 9-10, is to the left. A description of the North-South line is concluded in our Electric Traction Section on pages 404-6

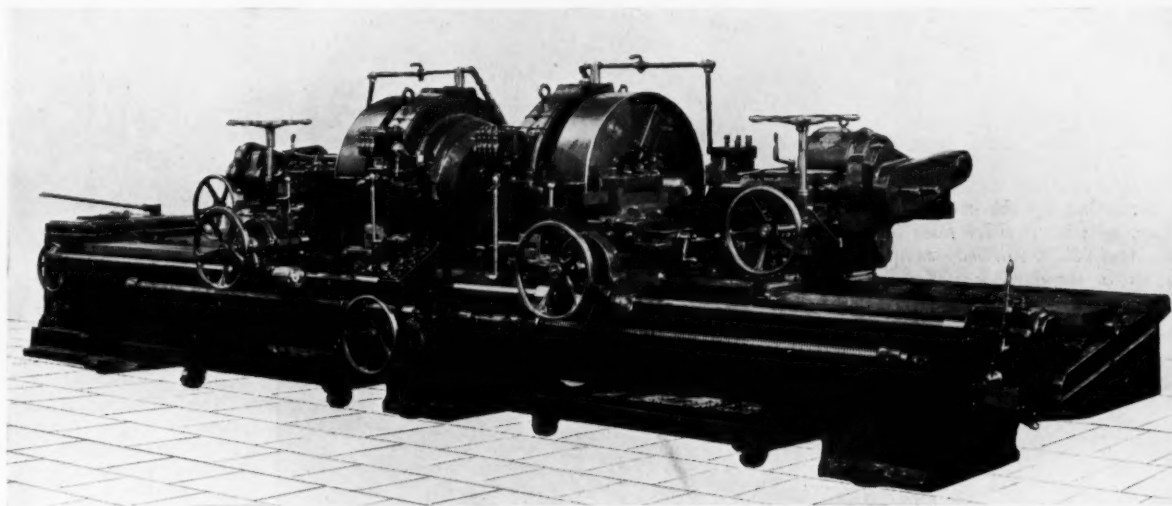
NEW MACHINE TOOL FOR RAILWAY SHOPS

Electrically driven Craven axle parting-off, ending, and centring machine

THE machine illustrated is designed and built for dealing with axles in the rough from $4\frac{1}{2}$ in. to $11\frac{1}{2}$ in. dia. and 8 ft. 6 in. maximum length. As indicated, the actual operations are parting-off to length, ending, and centring, prior to other operations on the axle. The time for handling the work in this sequence forms a large proportion of the total cost, particularly when the service of an overhead crane is needed to hold the bar while it is being set up in the machine. The machine has been specially designed with these objects in view, and the arrangement is such that a minimum amount of time is taken in loading, machining, and unloading.

In operation, the driving headstocks, which are fitted with hollow spindles each carrying a power-operated concentric chuck, are formed as combined units with the parting or

are adjustable with the headstocks along the bed by hand, and by power through a reversing motor mounted at the back of the bed, in conjunction with a friction clutch, and are each provided with a front and back rest with transverse power feed traverse for parting, the front rest being arranged also for ending the axle, with longitudinal hand adjustment and automatic trip motion to the transverse feed. Front and rear parting tool slides are provided, and in addition the front slide is arranged to accommodate a second tool which can be quickly brought into use for taking a second finishing cut after parting. Provision is made in the rear portion of the saddle to allow the discs parted off from the axles to pass to the rear of the machine and not fall between the shears of the bed.



Craven axle parting-off, ending, and centring machine

ending slides and drilling heads, and are moved apart along the bed by a quick power motion, to allow the work to be placed between them on an adjustable vee support at approximately the correct centre height. The driving headstocks are then traversed towards each other, the work passing through the chucks, until the parting tools are the correct distance apart. The chucks are then closed by power and grip the bar concentric with the spindles, after which the parting, ending, and centring operations are carried out; the unloading of the work is a reversal of the above procedure. Six spindle speeds are provided ranging from 16 to 64 revs. a minute.

The bed is of strong box section, with planed and surfaced top and highly densed flat ways for the reception of the carriages and headstocks, arranged to allow the spent lubricant and cuttings to drop through into the trays below. Two driving headstocks, each fitted with a hollow spindle running in parallel split capped bearings with automatic lubrication, are arranged to be driven by a powerful steel gear wheel, with a pinion running in an oil bath, from a shaft in the centre of the bed. The shaft is driven direct by a constant-speed motor and six-speed change speed gearbox at the end of the bed. The outer faces of the spindles are fitted with three-jaw concentric chucks to grip the axles. The chucks are operated by small constant-speed reversing motor units at the rear of the machine, controlled by push buttons.

The two saddles are attached to the driving headstocks and

The centring rests are fitted on the rear portion of the saddles and are quickly brought into position by means of a rack and pinion; stops are provided to position each spindle. Each rest has a drilling spindle and a countersinking spindle, to take Morse taper socket drills, revolving in anti-friction bearings and driven from independent motors, and are fed forward by hand.

The feed motion to the parting or ending slides is provided by a shaft at the front of the bed, driven from the main driving shaft in the bed through a change-speed gearbox at the end, and a slipping clutch is fitted to prevent damage. Six feeds are provided, giving from $\frac{1}{16}$ in. to $\frac{1}{8}$ in. traverse per revolution of the work. Spring-loaded wipers are arranged on the saddles and bear on the bed ways, effectively protecting the sliding surfaces from abrasion. The drive is by a 20 h.p. constant-speed motor mounted on the baseplate at the end of the bed, through a six-speed change gearbox with a friction starting clutch, to the driving shaft in the centre of the bed. A work support is used to hold the axle while the headstocks are traversed into the operating positions, or *vice versa*; this is placed on the bed between the headstocks and provided with height adjustment. The support can be removed when dealing with short locomotive axles. The machine has a centre height of $15\frac{1}{2}$ in., and the diameter of the hole through the spindles is 13 inches. The makers are Craven Brothers (Manchester) Limited of Reddish, Stockport.

British Railways and the War—41

Right: One of the new 45-ton railway steam cranes, of which twelve have been acquired by the four main-line railway companies for common use as a standard unit for emergency purposes. Brief details of these cranes are given at page 417



Left: A heavily-protected railway emergency control room for use during periods of aerial bombardment

RAILWAY NEWS SECTION

PERSONAL

The new Minister of Transport has appointed Mr. Denis O'Neill to be his Principal Private Secretary. The Parliamentary Secretary to the Minister (Mr. Frederick Montague) has appointed Mr. R. R. Goodison to be his Private Secretary.

Sir Edward Beatty, Chairman and President of the Canadian Pacific Railway, has joined the board of the company's subsidiary, the Associated Screen News Limited, as chairman. Mr. B. E. Norrish, former Managing Director of Associated Screen News, has been appointed President and Managing Director.

COLONIAL OFFICE APPOINTMENTS

The following promotions are announced:—

Mr. E. R. Masters, Senior Locomotive Superintendent, Gold Coast Railway, to be Chief Mechanical Engineer, Palestine Railways.

Mr. W. Venner, District Locomotive Superintendent, Gold Coast Railway, to be Chief Mechanical Engineer, Sierra Leone Government Railways.

Mr. H. W. Winson, Principal Assistant to Chief Accountant, Nigerian Railway, to be Chief Accountant, Gold Coast Railway.

The L.N.E.R. announces that Mr. F. S. Marshall, Yard Inspector, King's Cross passenger station, has been appointed Acting Assistant Stationmaster, King's Cross.

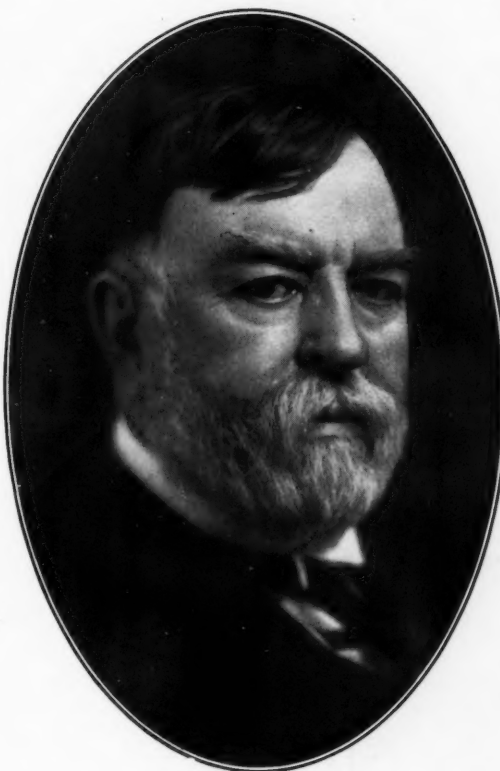
THE INSTITUTION OF AUTOMOBILE ENGINEERS

At the last meeting of the council of the Institution of Automobile Engineers the following awards for the session 1939-40 were made:—

The Crompton Medal. (For the best paper read before the senior centres of the institution during the session), to Dr. J. S. Clarke (Birmingham Corporation Gas Department) for his paper entitled "The Use of Gas as a Fuel for Motor Vehicles.")

The Graduates Prize. (For the best papers read before the Graduates' Section during the session), second prize (value £8) to Mr. J. F. Norwood (Luton branch) for his paper entitled "Gear Tooth Profiles"; third prize (value £5) to Mr. F. W. Judd (London branch) for his paper entitled "The Trend in the Development of the Compression-Ignition Engine."

Mr. Leonor Fresnel Loree, whose death we recorded in our October 4 issue, was born in Fulton City, Ill., U.S.A., on April 23, 1858. He was educated at Rutgers University, where he took his degree as a Civil Engineer. He entered railway service in 1877 as an Assistant in the Engineering Department of the Pennsylvania Railroad. Two years later he served as a Transitsman with the Engineer Corps, U.S.



The late Mr. L. F. Loree

President, Delaware & Hudson Railroad,
1907-1938

Army, and in 1881 joined the Mexican National Railway for preliminary survey work between the Rio Grande River and Santillo. In 1883 he became Assistant Engineer, Chicago Division, Pennsylvania Lines West, and in 1884 Maintenance of Way Engineer, on various divisions of the same system. Mr. Loree was made Divisional Superintendent of the Cleveland & Pittsburgh Division in 1889, and in 1896, at the age of 38, was appointed General Manager of the Pennsylvania Railroad. He became fourth Vice-President in 1901, and in the same year became President of the Baltimore & Ohio Railroad, a position he retained for four years, when he became President of the Chicago, Rock Island & Pacific

Railroad. Troubles in the financial circles dominating the railway annoyed him, however, and he left after nine months of service. In 1907 he accepted the presidency of the small but prosperous Delaware & Hudson Railroad. At the same time he became President of the board of managers, thus becoming responsible for financial as well as operating matters. Between 1926 and 1928 he was Chairman of the Missouri-Kansas-Texas Railroad, and at various times held directorships with the Erie; the National Railways of Mexico; the New York, Ontario & Western; and the Wheeling & Lake Erie Railroads. From 1899 to 1901 Mr. Loree was President of the American Railway Association, and in 1913 acted as Chairman, Eastern Group, President's Conference Committee on Valuation. He was a Member or Chairman of several boards which during the 1917-1919 war co-operated with the U.S.A. Government on transport matters, and he also served on the War Labour Board. Mr. Loree was appointed a Member of the Royal Commission (commonly referred to as the Duff Royal Commission), set up by the Dominion Government at the end of 1931 to investigate the railway transport position in Canada. He was the author of "Railroad Freight Transportation," a classic in the bibliography of the industry covering a much wider field than its title suggests. Mr. Loree retired in May, 1938, at the age of 80, after having been President of the Delaware & Hudson Railroad for 31 years.

INDIAN RAILWAY STAFF CHANGES

Mr. E. H. N. Lowther has been appointed to officiate as Divisional Superintendent, E.I.R., as from June 15.

Mr. P. N. H. Baker has been appointed to officiate as Divisional Superintendent, E.I.R., as from June 3.

Mr. L. A. Hoyle, Traction Superintendent, G.I.P.R., has been appointed to officiate as a Divisional Superintendent on that railway as from May 27.

Mr. G. H. Lamb has been appointed to officiate as Deputy Chief Mechanical Engineer (C. & W.), G.I.P.R., as from July 4.

Mr. P. E. Marmion has been appointed Chairman of the Burma Corporation in succession to Lord Horne, late Chairman of the G.W.R., whose death we recorded in our issue of September 6. Mr. M. L. Burnet has been appointed Vice-Chairman. Cap-

tain Oliver Lyttelton has resigned from the board on his appointment as President of the Board of Trade.

Mr. H. R. Caulfield-Giles, Transport & Traffic Manager, Newton, Chambers & Co. Ltd., Thorncliffe works, near Sheffield, has been elected Chairman of the Traders' Traffic Conference in succession to Mr. H. Currington, who has resigned the chairmanship after holding it for two periods, of three and thirteen years respectively. The Traders' Traffic Conference was founded 30 years ago and is an incorporated body holding a Board of Trade certificate under the Railway & Canal Traffic Act of 1888, and the Railways Act of 1921, and is a constituent member of the Traders' Co-ordinating Committee. Its membership includes most of the large industrial firms. The Secretary is Mr. H. H. Mansfield of the International Exchange, Edmund Street, Birmingham 3.

Lt.-Colonel N. E. Viner Brady, R.E., has now returned to the Southern Railway as General Purposes Officer, after having served in France in handling railway and transportation materials for docks and railways. Colonel Brady was educated at Marlborough and was articled in 1919 to the old L.B.S.C.R. In 1922 he became Engineering Assistant, and on the railway amalgamation of 1923 was appointed Engineering Assistant, Southern Railway. In this capacity he served in the Permanent Way and New Works Section of the Engineer's Department, and was the Resident Engineer on the reconstruction of Epsom station and the building of Whitton and North Sheen stations. He was also Resident Engineer in connection with the new locomotive shed and marshalling yard at Hither Green.



S.R. Home Guard No. 1.
Mr. Robert Holland-
Martin, Chairman of the
Southern Railway Com-
pany, photographed on
his turn of duty

Later he was responsible for Government works and traders' facilities. In 1934, Mr. Brady was made General Assistant to the Assistant Engineer for General Maintenance, and in January, 1939, was appointed General Purposes Officer, General Manager's Office, where he was engaged chiefly in the organisation of the Southern Railway A.R.P. As a member of the Supplementary Reserve (which he joined in 1926 as a Second Lieutenant), he was mobilised on the outbreak of war as Captain in the Transportation Stores Company, R.E. He became Major Commanding Transportation Stores Company, R.E., on February 25, 1940, and was promoted Lt.-Colonel Commanding H.Q. No. 1 Transportation Stores Group, R.E., on March 4. On August 7 Colonel Brady was invested by the King with the Membership of the Order of the British Empire, for services in France in the early months of the war.

Mr. Joseph Walker, whose retirement from the position of Assistant Traffic Manager of the Great Northern Railway (Ireland), we recorded in our issue of October 4, was for over 50 years associated with that railway. He joined the service as an apprentice clerk in 1885 and gained wide experience, having been stationmaster, Commercial Agent (Londonderry & Donegal District), Traffic Agent (over the whole system), and Outdoor Assistant to the Traffic Manager, before reaching the position of Assistant Traffic Manager. Mr. Walker was largely instrumental in developing the fishing industry on the Donegal coast which opened up a heavy traffic with Great Britain. He was also closely identified with the pooling arrangements between the railway companies. Another notable piece of work



Lt.-Colonel N. E. Viner Brady

General Purposes Officer, General Manager's Office,
Southern Railway

was that in connection with the opening of Maysfields cattle depot at Belfast. Mr. Walker was responsible for train arrangements on the occasion of the visits of the King and Queen, as Duke and Duchess of York, and H.R.H. Princess Mary and Viscount Lascelles. He also arranged what was probably the heaviest day's traffic ever handled by the railways in Ireland, namely, the Eucharistic Congress in Dublin in 1932, when the last train of some 50 specials by the Great Northern system arrived in Dublin to schedule. Mr. Walker's services have been so much appreciated by the board of directors and management of the company that on his retirement the directors requested him to remain associated with the company in a consultative capacity.

Mr. N. R. M. Macrae, Chief Accountant of Baldwins Limited, has been appointed Secretary and Chief Accountant of the company, in succession to Mr. E. H. Payton, who has retired.

Mr. I. B. Tigrett has become President of the Gulf, Mobile & Ohio Railroad, a merger, completed on September 13, of the Gulf, Mobile & Northern and the Mobile & Ohio Railroads. Mr. Tigrett, who, prior to the merger, was President of the Gulf, Mobile & Northern Railroad, was born at Friendship, Tenn., in 1879, and was educated at Union University where he graduated in 1898. In the next year he began a commercial career in a banking concern, and later became Organiser and Cashier of the Union Bank & Trust Company at Jackson, Tenn., where he remained until 1912. In that year Mr. Tigrett became President of the Birmingham & Northwestern Railway, a position he held until 1927 when the undertaking was merged with the Gulf, Mobile & Northern Railroad.

TRANSPORT SERVICES AND THE WAR—60

Repairing air raid damage—Control of station gas lighting—Workmen's tickets for A.R.P. night workers—Egyptian stationmaster's bravery—R.A.F. activity in the East—Transport in French Equatorial Africa

For the first time since the outbreak of war, the timetables of the four British main-line railways will be issued simultaneously, when the new schedules come into force on October 28. To advertise them a joint poster has been issued—also for the first time—with the uniform "British Railways" border.

More L.N.E.R. Repair of Air Raid Damage

More instances may now be given of the work done by L.N.E.R. engineering staffs in rapidly repairing tracks and other equipment damaged by air raids. Two high explosive bombs fell in a goods yard on the east coast of Scotland, destroying or distorting lines and points leading to 18 sidings. All the damage was made good within 12 hours. At a station in East Anglia both main lines were damaged just after the staff had left work and were on their way home. The men returned at once, restored one track within 40 min. of the air raid and had the other repaired within 3½ hr. Buses were called in to carry passengers during the interruption to the train service. During an air raid in the Midlands, an L.N.E.R. signal box was burnt out. The damaged structure was removed, the floor replaced (involving the threading of joists through the signal levers) and a temporary box 31 ft. long, 8 ft. wide, and 7 ft. high erected thereon, complete with temporary stairway. All steelwork in the supporting girders was stripped, red leaded, and repaired where necessary, and the whole job was accomplished in 17½ hr. At the same place, damage to the track at several points was repaired in 8 hr., and some of the men employed had previously had to evacuate their homes through delayed action bombs in the vicinity. Two platforms at an L.N.E.R. London station were damaged during a recent air raid and, when the debris had been cleared away, it was found that a broken water main had to be made good before traffic could be resumed. An L.N.E.R. plumber was making the final joint with molten lead when another air raid began; he carried on to completion and made it possible for the platforms to be brought into use for the rush hour that evening.

New 45-ton Railway Steam Cranes

The four main-line railway companies recently agreed upon a standard crane for emergency purposes, and, additional to already available equipment, twelve 45-ton steam cranes are being acquired for common use. Four of these will be normally stationed on the G.W.R., six on the L.N.E.R., and two on the S.R. The L.M.S.R. is sufficiently provided with similar equipment for its present needs.

The four cranes destined for the G.W.R. and the two for the S.R. are being supplied by Ransomes & Rapier Limited of Ipswich; one is illustrated at page 414. Brief particulars, indicating their range and versatility, are:—

Lifting capacity of crane with propping girders extended : 45 tons at 20-ft. radius, 16 tons at 40-ft. radius.
Carrying capacity of crane when travelling slowly : 15 tons at 20-ft. radius, 4½ tons at 40-ft. radius.
Height of lift at 20-ft. radius : From 30 ft. below rail level to 38 ft. above.
Maximum axle load when travelling in train : Not to exceed 15 tons.
Total weight of crane in working order, excluding relieving bogies : 94 tons.
Hoisting speed : 45 tons at 10 ft. a min.

The remaining six cranes are being supplied by Cowans, Sheldon & Co. Ltd., and these are to be stationed on the L.N.E.R.

The cranes have been designed so as to travel over any of the lines of the main-line railway companies and they will negotiate a curve of five chains radius.

An interesting feature of the design is the Stokes patent relieving bogies, which reduce the crane axle-loads when the crane travels in a train. These bogies are lifted clear of the track by the crane when the crane is to be used for lifting.

Operative power is supplied by 600 gal. of water and 10 cwt. of coal carried on each crane. The boiler is a Spencer-

Hopwood type, 7 ft. high by 4 ft. 6 in. dia., working at 120 lb. per sq. in. Each crane is equipped with turbo lighting equipment for night working.

The possession of these powerful cranes will increase the preparedness of the British railways to deal promptly and effectively with emergency engineering requirements.

Disposal of Unexploded Bombs

One feature of German air raids on this country is the dropping of unexploded bombs. The military authorities undertake the disposal of all such bombs except those falling on Admiralty or R.A.F. territory and bombs in enemy aircraft which have been brought down. The Civil Defence organisation is responsible for verifying the fact that an unexploded bomb exists, reporting on its situation, and deciding the order of priority of treatment by the military authorities. The actual removal is undertaken by a Bomb Disposal Section which is guided to the spot by the Civil Defence organisation. The presence is also secured of representatives of any public utility authorities affected by the operations before the Bomb Disposal Section begins to deal with an unexploded bomb.

Railway undertakings report unexploded bombs to the Controller of the appropriate Civil Defence Region, giving the address and telephone number of the railway representative with whom the Officer Commanding the Bomb Disposal Section should communicate. The relative priority of treatment of unexploded bombs on any railway system is assigned on the advice of the railway companies concerned. Recognition is thus given to the fact that unexploded bombs on railway property are usually of greater importance than those falling elsewhere. At the same time the railways make arrangements for the disposal of such bombs through the Civil Defence organisation so that co-ordination may be achieved of all the activities of Bomb Disposal Sections.

Centralised Control of Station Gas Lighting

It is a condition of the police when granting exemption under the Lighting (Restrictions) Order, 1940, that the agreed exterior lighting must be capable of being extinguished immediately upon receipt of the appropriate instructions. Gas lighting engineers who have had to deal with this requirement have no doubt experienced the inconvenience and expense of providing separate mains for indoor lighting and cooking when employing the Sugg distant control system for the control of the exterior lighting, and it is thought that the method successfully employed by the L.M.S.R. using the Sugg D.C. system for controlling exterior lighting on the same mains as indoor lighting and cooking will be of interest.

At Preston station the peacetime scheme of lighting provided for 42 sectional controls so that the exterior lighting on the platforms and stairways could be lighted or extinguished as traffic required. To extinguish rapidly the exterior lighting from this number of sectional controls would have been impracticable. A scheme of centralised control was, therefore, devised which would enable the exterior lighting to be turned off and on for A.R.P. purposes from two convenient points without extinguishing the interior lighting or the apparatus used by the refreshments department and messrooms, and, at the same time, leaving the sectional controls to function for ordinary use. The exterior lighting which it was desired to control comprised some 200 lamps on No. 1 control and 56 on No. 2 control. Most of the lamps were Rochester lamps with hexagonal opal dispersive reflectors and were already fitted with the Sugg distant control valve to operate in conjunction with the sectional control cocks mentioned above. It was necessary to obscure the opal glass to prevent upward light and reduce the superheaters from either four or six lights to one or two mantles. It was found by experiment that the minimum pressure at which the apparatus used by the refresh-

ments department and messrooms would reliably operate was about 1.4 in. w.g. This pressure, therefore, decided the extinguishing pressure for the controlled lamps. The distant control valves were adjusted so that the main gas supply to the burner was shut off at a pressure slightly in excess of 1.4 in. w.g. The whole of the installation was carried out by the Preston Gas Company to the requirements of Mr. W. K. Wallace, Chief Engineer of the L.M.S.R., under the direction of Mr. H. G. Hills.

Compressed Oil Gas in Place of Coal Gas

The L.M.S.R. has arranged for a rapid changeover to oil gas at any premises where the supply of coal gas may be cut off temporarily. The oil gas, which is manufactured by the railway company mainly for dining car cookers, is compressed to approximately 150 lb. per sq. in. and is distributed through high-pressure steel piping or travelling tanks. The calorific value varies between 1,150 and 1,175 B.Th.U./cu. ft. Where the high-pressure oil gas steel piping is in the vicinity of the coal gas main, a tee piece with valve is fitted to the former piping and connected to high-pressure governors, the outlet of which is connected to the coal gas main. A main cock is fitted to allow rapid conversion to oil gas. The pressure of oil gas is reduced in two stages, namely, the main governor reduces the pressure from 150 lb. per sq. in. to 6 in. w.g. and the second governor reduces to the working pressure. A $\frac{1}{2}$ in. spring-loaded relief valve is fitted between the two governors to allow the gas to escape to atmosphere in the event of any banking of pressure on the outlet side of the main governor. Where there is no oil gas main near the coal gas supply, a travelling tank wagon of oil gas is placed at the most convenient point and connections and governors installed in a similar manner, using the flexible filling pipe attached to the tank now used for filling the gas cylinders of dining cars.

Before turning on the oil gas, the valves or main cocks on the inlet and outlet side of the primary and secondary gas meters are closed and all lamps, burners, pilot-lights, and other appliances are shut off. The oil gas is then turned on and the appliances adjusted for the new calorific value. That is, the air adjuster on the lamps and burners are fully opened, and the gas adjuster is manipulated till the maximum candle power is obtained. Other gas appliances such as cookers, fires, and boilers, can be adjusted for the higher calorific value in a similar manner. The size of an oil gas flame is smaller than a coal gas flame. It is therefore desirable to change the mantles to get the best use out of the oil gas, but the flame will nearly fill a No. 1 mantle and even with a No. 2 mantle 50 per cent. illumination can be obtained. As regards the nozzle sizes, a No. 2 size nozzle can be adjusted easily for oil gas and a No. 1 size nozzle can also be made to function satisfactorily. There is therefore no need to change the nozzle. The arrangements have been carried out by Mr. G. Tomlinson on behalf of Mr. W. K. Wallace, the Chief Civil Engineer of the L.M.S.R., with the co-operation of Mr. W. A. Stanier, the Chief Mechanical Engineer.

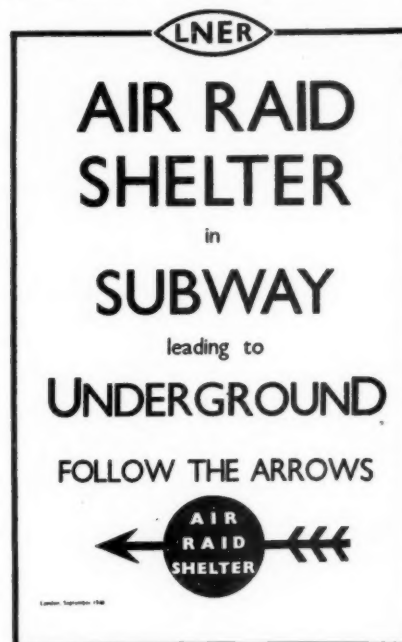
Workmen's Tickets for A.R.P. Night Workers

The main-line railway companies and London Passenger Transport Board have made arrangements to issue workmen's tickets permitting travel by ordinary services to workers who usually take workmen's tickets, but owing to their voluntary work in National Defence A.R.P. etc. organisations are unable, after their night duty in these services, to travel by the normal workmen's morning trains or London Transport trams and trolleybuses. To obtain this concession the employer must make application to the railway company at the station where the worker's journey usually originates, or, in the case of journeys on the services of London Transport, direct to the Commercial Officer, London Transport, 55, Broadway, S.W.1, for a form of certificate, which must be signed both by the employer and on behalf of the local authority for the defence service in which the worker undertakes voluntary work. On presentation of the completed certificate at the station at which the worker normally obtains his workmen's tickets or on the road vehicle, a workmen's ticket will be issued to enable the worker to travel to his or her normal place of employment. This

arrangement applies only to voluntary workers in the National Defence Services who, after night work in such services, are not able to make arrangements to travel by trains or London Transport road services by which workmen's tickets are normally recognised. The certificate must be withdrawn by the employer and returned to the railway company or London Transport should the worker change his ordinary employment or cease to be a voluntary member of the particular Civil Defence Service indicated on his certificate.

Direction to Shelter

The familiar black and yellow posters of the L.N.E.R. directing passengers to the nearest public shelter (illustrated



A new A.R.P. poster exhibited by the L.N.E.R. where shelter accommodation is available on station premises

at page 557 of our October 27, 1939, issue), have been amended and re-issued at certain stations where shelter is now provided on the spot. As a ready means of direction, a special arrow has been devised bearing a large black disc with



A streamer widely used by the L.N.E.R. as a "trail" from danger to safety

the word "air raid shelter" in yellow. Copies of the arrow alone are exhibited as a trail from the directing poster to the shelter.

Free Facilities for Troops at G.W.R. Centres

Arrangements are now in operation at Paddington and about twenty provincial centres on the Great Western Railway, under which, by arrangement with the War Office, members of the Services, of either sex, may obtain amenities without cost to themselves. The public left luggage, washing, and lavatory accommodation is available free to all officers and men of the Navy, Army, and Royal Air Force; the A.T.S., W.R.N.S., and W.A.A.F.S.; members of the Home Guard

wearing the uniform or brassard; and members of the Mercantile Marine wearing the official badge. Those requiring the facilities apply to a canteen recognised by the Services or, except at Paddington, to the Railway Transport Officer, by whom vouchers are provided which are available at any main-line station in the town of issue. Rifles and ammunition are not accepted as left luggage under the scheme.

Paddington Rest Rooms for the Forces

Reference has already been made in these columns to the canteen and recreative facilities provided for the men of the Forces in the staff dining club at the western end of No. 1 platform at Paddington station, G.W.R. The club was opened in August, 1939, through the financial support of the directors of the company. Some months ago it was decided to extend the facilities of the club to members of the Services, and thousands of Navy, Army, and Air Force men have since been catered for. During the past few weeks, in collaboration with the War Office, the existing amenities have been supplemented by rest rooms and toilet accommodation, situated immediately above the canteen. The new rooms have been fitted out in premises previously occupied by a section of the Chief Accountant's office. The alterations, which were carried out by the company, involved converting the existing rooms into two large lounges, toilet accommodation, and offices. The lounges are furnished with easy chairs, settees, and tables, and the toilet quarters are fitted with hot and cold water. The Army authorities co-operate in the control of the new premises by detailing Servicemen for orderly duties.

Minister of Transport on Prompt Action

The Minister of Transport, Lt.-Colonel T. C. Moore-Brabazon, in a press conference on October 11, gave several instances of railwaymen's gallantry in dealing with wartime emergencies. As an example of promptness in action he cited the following:

4.40 p.m. (September 25). 3 H.E. bombs were dropped on the company's main line destroying over 100 yards of track.
4.50 p.m. News received at Divisional Office and instructions issued to 60 men standing by.
5.25 p.m. Men had traversed 4 miles by road and 1 mile over track while raid was still in progress.
7.30 p.m. Darkness intervened and Police authority had been obtained for the work to be carried out under flares.
8.45 p.m. Up line made good.
9.30 p.m. Another air raid.
10.45 p.m. Another air raid.
11.15 p.m. Down main line restored.

Railwaymen's Heroism in Egypt

Two railway incidents in the western desert have now been told in a Reuters message from Cairo. The coolness and courage of the Egyptian stationmaster at a small railway station in the desert in saving two ammunition vans from being blown up were described by a British officer who arrived in Cairo on leave. During the height of a recent Italian air raid, with bombs falling and shrapnel ricocheting across the station platform, the stationmaster and two Egyptian railwaymen coupled a light engine to two wagons filled with ammunition and high explosive, got up steam, and dragged them some miles away to safety. The Egyptian's outstanding bravery, which possibly averted a severe explosion, so impressed the British military authorities that they have recommended to the Egyptian authorities that he be given the highest award possible, it is understood. On another occasion, when a train from the western desert was due to leave, the Egyptian driver was wounded by bomb splinters and obliged to quit his post. The officer commanding the troops in the train walked down the platform calling for a volunteer to take the driver's place. A British Army padre responded; he had once, he explained, driven a train during the general strike of 1926. He drove the train the entire 200 miles to its destination, stopping at every wayside desert halt on the journey. Only when he approached a difficult network of lines at the end did the padre pull up the train and obtain the services of a local railwayman to drive the train into the station.

R.A.F. Activity in the East

For some time past the Royal Air Force has appeared to concentrate its main attention in the East on Italian objectives in Lybia with the object of destroying communications for the forces which penetrated into Egypt. A communique issued in Cairo on October 4 shows that important objectives on other fronts are not being neglected. It stated that

successful bombing attacks had been carried out on railways and rail-junctions in Abyssinia and Eritrea. The Djibouti—Addis Ababa railway has been bombed, and an important junction hit; it was also reported that the line to Direedawa has been blocked. At Agordat, Eritrea, an attack was made on the railway to Massawa and direct hits were registered on the station buildings and the track. It was stated on October 8 that one of the most vital Italian supply lines in East Africa had been cut as a result of R.A.F. bombing of Aisha in the preceding few days. This station is about 100 miles from the coast on the line between Addis Ababa and Djibouti. It was also reported that among other points on the railway which had been bombed were Adagalla station, which is a further 50 miles inland, the Awash bridge, and the Culldehar tunnel; of the last named it was said that one end had been blocked. In a series of raids on Benghazi on October 13-14 it was reported that the "main railway sidings were attacked with great success."

French Equatorial Africa

There has always been the possibility that enemy action might be diverted to Africa, and we have pointed out from time to time the strategic importance of the Near East. With the large Italian forces now in Libya reinforced by German divisions from Europe, a southward push from Egypt and the Sudan might threaten South Africa. On August 27 General de Gaulle announced that the French Colony of Chad would continue the struggle in alliance with Great Britain, and two days later he was able to state that French Equatorial Africa and the French Cameroons would also join in. On September 1 the Governor of Gabon placed himself under the flag of Free France. Thus, the whole of this territory, a solid block about 2,000 miles long and extending from the borders of Nigeria down to the Belgian Congo, is now on the side of the Allies and is of great strategic importance both from the point of view of communications and a possible enemy offensive southwards. The accession of French Equatorial Africa and the Cameroons gives us a broad belt of country stretching right across Africa from the Atlantic to Kenya, with cross communications east to west, barring the road to an enemy advancing from the north. The increase of military effects involved is small because the French colonies were but lightly garrisoned; but strategically we profit very greatly by the change in Central Africa from potential hostility to co-operation and alliance. The total area of French Equatorial Africa, including the military territory of Chad, is 982,000 square miles, with a population of about three and a half millions. These are divided between numerous tribes and races. Across this vast area from east to west, from Jellab on the Sudanese border to Mount Cameroon on the Atlantic shore, there runs a ridge of high ground rising from 1,500 to 4,500 ft. above sea level. This ridge joins the Darfur plateau of the Western Sudan to the coastal range which stretches from south of Lake Chad to the mouth of the Congo; it separates the Congo basin from that of the Chari River and its many tributaries which empty into Lake Chad, and from the huge low lying desert area that surrounds the lake.

The river system of French Equatorial Africa, although so extensive, has never wholly met the transport requirements of the country, as through navigation is rendered impossible by rapids. In the Belgian Congo, railway communication was early established, the line from Leopoldville to Matadi having been constructed some 40 years ago. Within recent years a similar, but more direct line, was built in French Equatorial Africa, uniting the capital of Brazzaville with the Atlantic port of Pointe Noire, north of the mouth of the Congo; this is the only railway in the French Congo. Below Brazzaville the Congo is not navigable owing to the numerous rapids, but from Brazzaville the rivers Congo and Ubangi are navigable as far as Bangui to which point there is a regular service of river steamers. The Congo itself is navigable as far as Stanleyville. Over the whole country there exists a fairly comprehensive system of motor roads. Civil aviation has been developed successfully in recent years, and numerous air bases and landing grounds have been established.

The railway between Brazzaville and Pointe Noire, known as the Congo-Ocean Railway, was first projected as long ago

as 1886, but it was not until July 12, 1909, that the first law was promulgated authorising a capital loan, and it was in the budget law of 1925 that the expenditure was finally voted. The railway was surveyed by the Compagnie des Batignolles between 1910 and 1912, but construction did not begin until early in 1921. A 2-ft. gauge line, nearly 100 miles in length, connecting Minduli (an important mining centre) with Brazzaville, was opened in 1912 and this was incorporated in the Congo-Ocean Railway. Its gauge was widened to the 3 ft. 6 in. which was adopted in order to permit of eventual connection between the Congo-Ocean Railway and other African systems. The construction of the line occupied 13 years for the 510 km. (317 miles) of difficult route. Work was begun on February 6, 1921, from the Brazzaville end and the whole line was completed and opened to traffic on July 10, 1934. Heavy engineering works were involved, including the Bamba tunnel, 1,850 yd. in length (the longest in Central Africa), as well as 14 large reinforced-concrete viaducts. As far as possible the maximum adverse gradient for trains running from Brazzaville to the coast, which is the direction of greatest traffic, has been kept down to 1 in 67. There are, however, two stretches at 1 in 50 in the Mayumbé mountains to be climbed by trains from Pointe Noire. Between Pointe Noire and Brazzaville there are four stations and 23 halts.

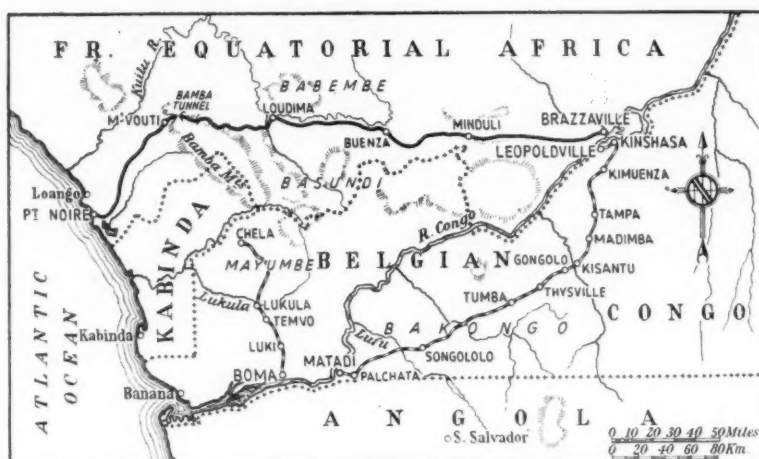
The Cameroons

The Province of the Cameroons, which has an area of 154,444 square miles and a population of about 2,000,000, consists almost entirely of the former German colony taken over in 1918. It is not, properly speaking, part of the French Colonial Empire, but is held by France under a mandate from the League of Nations. Along the north-west border separating the Cameroons from British Nigeria runs a range of mountains rising to a height of over 5,000 ft., and forming a barrier difficult to penetrate. The rest of the country is a vast plateau intercepted by broad but shallow river valleys. The mountain range is thickly forested. Along the coast south of the range is a wide equatorial forest, but north of the line Douala—Yaounde the country is, for the most part, open savanna.

Douala, the chief port of the country, is a place of great potentialities and can dock ships up to 10,000 tons. It is connected by railway with Yaounde, and (from Bonaberi, near Douala) with Enkongsamba close to the Nigerian frontier. There is also a good road system which extends to the boundaries of the province and affords easy communication with Chad; in addition, river transport is easy and important. As in their other Central African possessions, the French have developed civil aviation, and from the Cameroons there has been a weekly service to such places as Brazzaville, Bangui, and Fort Lamy. The Northern Cameroon Railway was built by German contractors from the coast at Bonaberi (near Douala) for the 160 km. (100 miles) to Enkongsamba. Construction was difficult by reason of the fact that large swamps had to be crossed, numbers of rivers bridged, and heavy grades negotiated in the climb into the hilly country. The line was opened to Enkongsamba at the foot of the Manengueba mountains in 1911. The main line from Douala to Yaounde is 308 km. (191 miles) long and is known as the Central Cameroon Railway. There is also a branch of 37 km. (23 miles) from Otele to Mbalmayo. All the Chemins de fer du Cameroun are of metre gauge.

Daylight Saving Time and Canadian Timetables

Due to the extension of daylight saving time, the Canadian railways, which were ready to change back to their winter schedules, have decided to carry on service in modified summer form. In the main, train time changes are necessary only for trains which make connections with United States lines, whose train times are different because daylight saving time ended



Sketch map of the railways of the Congo

there on September 28. Other changes by the Canadian railways are chiefly those consequent upon summer residents moving back into Montreal from the Lakeshore, South Shore, and northern communities. These involve some cancellations of services. The Dominion Government has made no announcement about the period for which daylight saving time has been extended. It is understood, however, that there will probably be a return to standard time before midwinter. Railways are expected to make further adjustments in their timetables when this happens. In the meantime they are doing their best to co-operate with the Government, whose order extending daylight saving time for Quebec and Ontario is designed to save electricity for the use of war industries.

Railway Disturbance in Germany

From the somewhat sparse reports received through neutral sources and based on the stories of travellers who have recently returned from the Reich, it would appear that German train services, especially in the west and north-west, are subject to very considerable delays, doubtless as a result of damage to railways caused by the activities of the R.A.F. One observer says that there is an average lateness on some long-distance services of 14 hr., and a story given by a Roumanian visitor to the Leipzig Fair stated that the service to Switzerland along the left bank of the Rhine was as much as 40 hr. late.

Italian Coal Imports from Germany

The General Staff of the Germany Army Command in Slovakia, on September 12 ordered the State Railways of the Protectorate of Bohemia & Moravia to supply several hundreds of wagons in order to hasten the completion of a new strategic motor road leading from west to east through Slovakia. After objections had been made by the Protectorate railway authorities, Berlin is said to have cancelled the order given by the military authorities and told the latter that deliveries of Silesian and Bohemian coal to Italy, for which the Protectorate wagons are needed, must on no account be interrupted. Italian coal imports from Germany in July amounted to 1,087,000 tons, according to the Official German News Agency. The total imports of coal from April to July are stated to have amounted to 4,145,000 tons.

Railways of the U.S.S.R.

The activities of the U.S.S.R. during the past 13 months have resulted in considerable acquisitions of territory either as a result of military attack or in consequence of "ultimatums" accepted by small neighbouring states. These territories comprise what are now described as the new Soviet Republics of Latvia, Lithuania, and Estonia, and part of Finland, and those portions of Poland and Roumania called Western Ukraine, Western Belorussia, Bessarabia, and Northern Bukovina. In all, this has resulted in an increase of nearly 10,000 route miles of line to the Soviet railway

system, the total length of which is now stated officially by the Soviet newspaper *Izvestia* to be more than 62,000 miles.

Transport Restrictions in Turkey

It was reported in Istanbul on September 8 that the Turkish Government was proceeding steadily with the fortification of its frontiers. The whole of Thrace from the Bulgarian and Greek frontiers to Kutchuk Tchekmedje, some 20 miles from Istanbul, has been made a military zone, together with the Dardanelles on the Asiatic side as far as Panderma on the Sea of Marmora. Access to such zones is forbidden to foreigners unless they are through-travellers, and aeroplane flights across them are also forbidden. All important bridges and railway centres throughout Turkey are now guarded by troops.

Transport in Luxembourg

Luxembourg is now included in the German customs area. The old frontier customs stations have been re-established as they were up to 1918. The Luxembourg railways have been brought under the Reichsbahn Direktion at Saarbrücken. Most of the staff in Luxembourg territory is German again, and the large railway offices built by the Germans before the war of 1914-19, near the Pont Adolphe in Luxembourg Town, are being used again by the Reichsbahn.

Reconstruction of Transport

Paper read by Mr. Frederick Smith before members of the Institute of Transport

Mr. Frederick Smith, in an address to the Institute of Transport in London, on October 14, dealt with "The Reconstruction of Transport Policy." Mr. Smith said that transport had become one of the determining factors in industry, and could now be said to form the framework of the national economy. Road transport had been allowed to reach maturity undirected and unplanned until it had become a most formidable competitor to the railways. Railways in defence had undertaken campaigns urging further restrictions on road transport in complete freedom from their restrictions. The solution to the transport situation was to be found in the development of operating policy, rather than in price control. Attempts at reform had been made recently with little success. As a policy of development two courses were open—complete elimination of regulation and consequent freedom of competition, or alternatively development based on a combined planning of rail and road operation.

Present-day rail operations were uneconomic, declared Mr. Smith; wagons were not employed to full capacity and there was great waste of engine power. Development should be based on more efficient use of the available equipment.

Mr. Smith proceeded to outline his proposals for putting into effect substantial economies through the speeding up of train movements, and the concentration of train loading and train movement upon stations between which full wagon and train loads could be assured. [This matter was dealt with at length in a letter from Mr. Smith to the Editor of THE RAILWAY GAZETTE published in our issue of October 4, at page 349.]

Turning to the machinery for reconstruction of transport policy, which Mr. Smith described as of major impor-

tance, he said that at the present time there was virtually no co-ordination even of planning. There was no central body charged with full executive responsibility for the transport services.

The organisation of the Ministry of Transport itself was not designed for the solution of such major problems as would have to be dealt with, but it could not be doubted that the Ministry was the right place for the national planning of reconstruction which was necessary. It was singularly unfortunate that the Ministry of Transport had followed traditional Civil Service lines, and was founded on the belief that any Civil Servant could do any job, however trained or untrained professionally he might be. It was difficult to understand why some Government Departments were organised on that assumption, because it was a type of organisation by no means common to all Government Departments. It would be inconceivable, for example, that the Board of Admiralty, the supreme governing body of the Navy, should not be composed mainly of professional naval officers; it would be still more inconceivable that the Air Council should not in the main be composed of professional air officers; but in an important Department like the Ministry of Transport, which had to deal with matters at least as highly technical as those dealt with in the Military departments of State, that there should be no similar general staff, composed in the main of full-time professional transport men, was particularly unfortunate.

It was therefore suggested that the next stage of development of the Ministry of Transport should follow as closely as possible the organisation of the Admiralty and the Air Ministry and that the Minister should be assisted by a full-time transport council, analogous to the Board of Admiralty, consisting

"Southern on Guard"

The September issue of the Southern Railway wartime staff bulletin has appeared under the title *Southern on Guard* and is devoted to the Southern Railway Home Guard activities; it ranks as No. 3 issue of *Southern on Service*. The illustrated articles cover such subjects as the Making of the Southern Home Guard, the S.R. Home Guard in Action, a Message from the Group Commander (Mr. F. J. Wymer), and Teaching New War Methods.

An interesting series of lectures is being given to members of the S.R. Home Guard by Lt.-Colonel N. E. Viner Brady, M.B.E. Colonel Brady, whose portrait appears at page 416, went to France at the outbreak of war and carried out some very useful work in connection with the transport of stores and equipment. His lecture illustrates the organisation needed to feed and equip an army on active service, and the close co-operation which existed with the French Railway Authorities. He also gives first-hand information of the methods adopted by the Germans which completely disorganised all forms of communications in France, and outlines the steps to be taken by Home Guards to prevent a repetition in this country should the necessity arise, and to keep open at all costs essential lines of military communication.

in addition to the Permanent Secretary to the Ministry, of professional transport officers experienced in different branches of the transport profession, but severing their connections with individual transport interests, and becoming full-time servants of the State. There was a most urgent need, even for war purposes only, for the establishment of such a General Staff, and indeed the process of development of transport policy which would be necessary after the war, would be of immense service to the war effort and might be commenced at once. It was indeed much to be regretted that the whole of the spring and summer had passed without any attempt being made to anticipate the transport difficulties which were experienced last winter by a better centralisation of transport control by such means for the coming winter. It was not too late to take active steps in that direction, and those steps would provide the experience and lay the foundations for a proper post-war organisation.

Quite apart from any re-organisation of the Ministry of Transport, much could be done by the railway companies themselves now theoretically under the direction of the Ministry, by establishing a central railway organisation for the purpose of development on the lines indicated in that paper. The nucleus existed in wartime in the shape of the Railway Executive Committee. That was, however, a comparatively small body dealing more with general principles than with day-to-day working, and despite the fact that the railway companies were closely associated through their system of Railway Clearing House Conferences, there would have to be a merging of operating staffs for purely executive work. Unification of railway administration would, of course, present a difficult problem by reason of its size, but size was no obstacle to the proper administration of a well-organised business, particularly having regard to the excellent system of communications at the disposal of the railway companies.

NOTES AND NEWS

L.M.S.R. Debentures.—A balance of the 5 per cent. redeemable debenture stock of the London Midland & Scottish Railway Company will be struck at the close of business on Friday, October 25.

Leyland & Birmingham Rubber Co. Ltd.—Presiding at the recent annual general meeting of this company, Mr. Henry Berry said that the company had been satisfactorily engaged during the year under review and he expressed sincere thanks to the management and the workpeople for their excellent services. The buildings and plant had been maintained in proper efficiency.

Yorkshire Airways Limited.—An extraordinary general meeting of the members of Yorkshire Airways Limited was held in Leeds on October 7 when a resolution for the voluntary winding-up of the company was passed. A formal notice in *The London Gazette* announced that all debts will be paid in full. The Yorkshire Aeroplane Club Limited which, like Yorkshire Airways Limited, is under the chairmanship of Mr. Ronald Henry Braime, was also placed into voluntary liquidation on the same date and similar notice of the payment of debts in full has been made.

Burma Corporation Limited.—Mr. P. E. Marmion, Vice-Chairman, Burma Corporation Limited, has been appointed Chairman (in succession to the late Lord Horne), and Mr. M. L. Burnet has become Vice-Chairman. Captain Oliver Lyttelton has resigned from the board on his appointment as President of the Board of Trade. The Burma Corporation, the registered office of which is in Rangoon, has an authorised capital of Rs. 18,000,000. The company, which must always be under British control, owns the Bawdwin silver-lead mines. Among the assets of the mines are smelting and other plants and about 50 miles of 2-ft. gauge railway situated in the Federated Shan States, Upper Burma. This line links the Bawdwin mine, the Namtu smelter and other plants, and the local adminis-

trative headquarters, with the Lashio branch of the Burma Railways, now famous as a section of the Burma Road route, from Rangoon to Kunming in China. Though of narrow gauge, the Burma Corporation railway system is partly electrified and carries a heavy traffic, regulated by Western Electric train control.

South American Railway Congress.—The fourth South American Railway Congress is to be held at Bogota, capital of the Republic of Colombia, in February, 1941. The first of these congresses was held, on the initiative of the Argentine Republic, at Buenos Aires in 1910. The second, in 1922, was held in Rio de Janeiro, and the third, in 1929, at Santiago. The Permanent Commission is considering a proposal to extend the scope of the congress by converting it into a Pan-American Railway Congress.

The Traders' Traffic Conference.—This conference was founded 30 years ago and is an incorporated body holding a B.O.T. certificate under the Railway & Canal Act, 1888, and the Railways Act, 1921. It is a constituent member of the Traders' Co-ordinating Committee. The Secretary of the Conference is Mr. H. H. Mansfield, of International Exchange, Edmund Street, Birmingham 3. As recorded at page 416, Mr. Caulfield-Giles, Transport & Traffic Manager of Newton, Chambers & Co. Ltd., Thorncliffe works, Sheffield, has been elected Chairman.

L.M.S.R. Express Derailed.—A serious derailment to an L.M.S.R. Liverpool—London express occurred on Saturday, October 12, at Wembley, due to a luggage trolley running down a platform ramp, from some cause not yet made clear, and fouling the track. The driver saw the danger and had reduced speed considerably. It is stated that the trolley became wedged in some points. Nine lives were lost and many persons injured. The locomotive was overturned and some vehicles piled upon it. Railwaymen, A.R.P. workers, and others assisted in rescuing the injured, and continued without intermission after an air raid

warning was received. Major G. R. S. Wilson is inquiring into the circumstances of the accident on behalf of the Minister of Transport.

Proposed Underground Railway for Rio de Janeiro.—At the suggestion of the Minister of Transport the Prefect of Rio de Janeiro is to appoint a commission of engineers to collaborate with others from the Ministry of Transport in the study of a project for an underground railway for the city of Rio.

British and Irish Railway Stocks and Shares

Stocks	Highest 1939	Lowest 1939	Prices	
			Oct. 15, 1940	Rise Fall
G.W.R.				
Cons. Ord.	38	21½	31	—½
5% Con. Pref.	92	71	75	+½
5% Red. Pref. (1950) ..	98	83	93½	—
4% Deb.	103	91	101½	—½
4½% Deb.	105½	93½	103½	—
4½% Deb.	110	99	108½	—
5% Deb.	121	109½	112½	—
2½% Deb.	63½	54	62	—
5% R. Charge	117	104	110½	—
5% Cons. Guar.	111	96½	103½	—
L.M.S.R.				
Ord.	17	9½	12½	—
4% Pref. (1923)	46½	20	34½	—½
4% Pref.	63½	37½	45½	—½
5% Red. Pref. (1955) ..	83	58½	73½	—½
4% Deb.	98½	85	90½	—
5% Red. Deb. (1952) ...	109	101½	106	—
4% Guar.	87½	73	74½	+½
L.N.E.R.				
5% Pref. Ord.	5½	3½	3	+½
Def. Ord.	3½	1½	1½	—
4% First Pref.	38½	19	31½	—½
4% Second Pref.	15	7½	10	—
5% Red. Pref. (1955) ...	55	38	50	—
4% First Guar.	78½	60	66	+2
4% Second Guar.	68½	47	53½	—
3% Deb.	71½	57	63	+½
4% Deb.	93	76	82	—
5% Red. Deb. (1947) ...	106½	98	103	—
4½% Sinking Fund Red. Deb.	104½	96	99½	—
SOUTHERN				
Pref. Ord.	78	46½	40½	—½
Def. Ord.	19½	7	9½	—
5% Pref.	100	76	72	—
5% Red. Pref. (1964) ...	102½	94	87½	—
5% Guar. Pref.	116½	103	104½	—½
5% Red. Guar. Pref. (1957) ..	112½	102½	103½	—
4% Deb.	103	91½	92½	—
5% Deb.	118½	109½	112½	—
4% Red. Deb. (1962-67) ..	106	98	101½	—
4% Red. Deb. (1970-80) ..	102	96	100½	—
FORTH BRIDGE				
4% Deb.	98½	81	87½	—
4% Guar.	95	80	85½	—
L.P.T.B.				
4½% "A"	115	103	105	—½
5% "A"	123	106½	113½	—½
4½% "T.F.A."	105	100½	102	—
5% "B"	117½	102	102½	—
"C"	84	63½	27½	+½
MERSEY				
Ord.	24½	17½	20½	—
4% Perp. Deb.	93½	88½	89½	—
3% Perp. Deb.	77	65½	50½	—
3% Perp. Pref.	55	49½	54½	—
IRELAND				
BELFAST & C.D.				
Ord.	6	3	4	—
G. NORTHERN				
Ord.	6	2½	3½	+½
G. SOUTHERN				
Ord.	13½	8	6	—
Pref.	26	10	20	+½
Guar.	40½	22	20	—
Deb.	57	45½	39	—

Irish Traffic Returns

IRELAND		Totals for 40th Week			Totals to Date		
		1940	1939	Inc. or Dec.	1940	1939	Inc. or Dec.
Belfast & C.D. (80 miles)	pass.	£ 3,072	£ 2,382	+	£ 690	£ 133,908	£ 25,843
	goods	1,007	650	+	357	23,826	5,441
	total	4,079	3,032	+	1,047	157,734	31,284
Great Northern (543 miles)	pass.	13,800	11,550	+	2,250	498,650	32,450
	goods	17,650	15,650	+	2,000	515,900	90,250
	total	31,450	27,200	+	4,250	1,014,550	122,700
Great Southern (2,076 miles)	pass.	36,845	36,218	+	627	1,452,853	79,011
	goods	55,660	66,582	—	10,922	1,839,842	142,136
	total	92,505	102,800	—	10,295	3,292,695	322,950
L.M.S.R. (N.C.C.) (247 miles)	pass.	6,150	4,140	+	2,010	232,860	193,090
	goods	4,830	3,350	+	1,480	158,280	119,170
	total	10,980	7,490	+	3,490	391,140	312,260

OFFICIAL NOTICES

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Wednesday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

Railway and Other Reports

Madras & Southern Mahratta Railway Co. Ltd.—The directors announce a final dividend of 3 per cent., making 5½ per cent. for the year ended March 31, 1940. Both these distributions are the same as for the previous year. Net profit is £64,871 against £59,693.

Barranquilla Railway & Pier Co. Ltd.—Net income to June 30, 1940, was £5,296, against £5,251. Adding £1,712 brought forward makes a total available of £7,008, which enables a dividend of 3d. a share to be paid, leaving £1,618 to be carried forward. Various claims against the company in Colombia remain unsettled.

Barsi Light Railway Co. Ltd.—Net earnings for the year to March 31, 1940, less Indian income tax and super tax, were £46,726, against £52,673, or, less exchange adjustments of £176, £46,550. After providing £8,900 for interest on debenture stocks and £5,676 for interest and sinking fund instalment, etc., on Latur Extension debentures, there is left £31,974, which with £13,088 brought forward and £931 interest and dividends, makes £45,993. The directors have appropriated £2,500 to taxation reserve and £2,914 to reserve for renewals. A final dividend of 2 per cent. is recommended on the ordinary stock, making 3½ per cent. for the year (same), leaving £13,089 to be carried forward. Traffic receipts for the year were Rs. 16,94,283, against Rs. 18,54,664, and working expenses were reduced from Rs. 10,56,132 to Rs. 10,32,297.

Ribble Motor Services Limited.—The interim dividend is 4 per cent. (same).

Eastern Counties Omnibus Co. Ltd.—Interim dividend on ordinary capital 3 per cent., tax free (same).

Silverton Tramway Co. Ltd.—Revenue for the year ended June 30, 1940, was £158,251 (against £173,089 for 1938-39). Expenses and taxes were £98,274 (against £98,215), and net profit, after depreciation, etc., is £53,915 (£62,755). Adding balance at June 30, 1939, of £33,352 gives a total available of £87,267. From this £50,000 is deducted for dividends paid on August 8, 1939, and February 2, 1940, £886 is transferred to reserve accounts, and £5,000 goes to further provision for income tax, leaving a balance of £31,381,

from which £25,000 has been appropriated for dividend paid on August 28.

Colvilles Limited.—Interim ordinary dividend of 3 per cent., less tax (same).

Kitchen & Wade Limited.—The interim dividend is 12½ per cent., the same as a year ago.

Babcock & Wilcox Limited.—Announcement is made of an interim ordinary dividend of 4 per cent. on account of 1940, the same as on account of each of the six preceding years.

Skefko Ball Bearing Co. Ltd.—An interim dividend of 4d. a share (6½ per cent.), free of tax, has been declared in respect of 1940, payable November 5. In October, 1939, the interim dividend was 4½d. a share (7½ per cent.) tax free.

G. D. Peters & Co. Ltd.—Interim dividend on the ordinary shares of 7½ per cent. This compares with 15 per cent. paid last year, but is payable on the capital as increased by the 50 per cent. bonus issue made in December last.

Manganese Bronze & Brass Co. Ltd.—A half-yearly dividend of 3¼ per cent. has been declared on the 7½ per cent. non-cumulative preference shares payable on October 25. The directors have decided to defer consideration of a dividend on the ordinary shares until the full year's results are known. The profit for the current year to date compares favourably with that of the corresponding period of last year.

Serck Radiators Limited.—Profit for the period from August 6, 1939, to August 3, 1940, amounted to £57,968, against £58,852 for 1938-39. Sums of £12,500 (same) and £20,000 (£15,000) are transferred respectively to reserve for buildings and to general reserve. The directors again recommend a dividend of 15 per cent. (3s. a share), and a bonus of 7½ per cent. (1s. 6d. a share), both tax free, making 22½ per cent., tax free, for the year, the same as for 1938-39. It is proposed to carry forward £10,901, against £11,308 brought in.

United Steel Companies Limited.—The profit and loss account for the year to June 30, 1940, is presented in a different form from that previously adopted. The profit of £2,256,078 now shown is a consolidated figure for the company and its subsidiaries showing the combined results of the group as a whole. It is arrived at after deductions for excess profits tax, depreciation, and debenture interest, but before income tax. The comparable figure for the

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previous year was £1,660,426. Income tax reserve takes £1,493,000, central reserve for obsolescence £125,000, staff funds £130,000, and debenture redemption £45,495. A final dividend of 5½ per cent. again makes 8 per cent. for the year, and the carry forward is £412,189, against £411,600 brought in.

Staff and Labour Matters

Horse Carters' Wages—Scottish Railway Cartage Contractors

The National Arbitration Tribunal recently heard a dispute between the Scottish Horse & Motormen's Association and Wordie & Co. Ltd., Cowan & Company, and Mutter Howey & Co. Ltd., in regard to the rates of wages of horse carters. The dispute arose out of a claim by the association for a revision of the existing rates of wages paid by the firms under an agreement which was executed on or about April 24, 1940, clause 5 of which reads as follows: "This agreement shall have effect as from January 1, 1940, and shall remain current until December 31, 1940, and from year to year thereafter with the option of a break at six-monthly periods, provided not less than one month's notice has been given." The tribunal awards that the terms of the agreement hold until December 31, 1940.

Questions in Parliament

Detentions

Mr. Stokes (Lab.—Ipswich) asked the Home Secretary, on October 8, whether the case of Mr. E. L. Diamond, A.M.I.Mech.E., M.Sc., detained under Regulation 18b, who, before the war worked for 13 years on the staff of the Institution of Mechanical Engineers, has yet been heard by the advisory committee; and, if so, what was the decision.

Mr. H. Morrison: This case has not yet been heard by the advisory committee, but I understand that it hopes to be able to hear it in the near future.

Forthcoming Meetings

Nov. 13 (Wed.).—Bengal Dooars Railway Co. Ltd. (Ordinary general), Gresham House, E.C., at 12.30 p.m.

Dec. 3 (Tues.).—Buenos Aires Central Railroad & Terminal Company (Lacroze Subway) (Annual ordinary), Corrientes 222, Buenos Aires, at 11 a.m.

Railway Stock Market

Despite the frequent air raids and the disposition to await the next turn of events in the war and international news, the stock and share markets have maintained a steady undertone. Sentiment was assisted by the strength of British Funds, and also by hopes attaching to the forthcoming proposals of the Government for insuring property against air-raid damage, which it is hoped in the City may contain provision for interim compensation for loss of earning power. Home railway securities have been relatively steady, and with few exceptions, movements on balance were small and unimportant. The market is very hopeful that the decision in regard to increased rates and fares will be made shortly and that the full terms of the financial agreement between the Government and the railways may also be published in the near future. In some quarters it is being suggested that the agreement may be revised at the end of the year, but both from the long and short term angle, such revision would probably be a satisfactory development for the railways, and so far as it is possible to judge, the stocks of the main-line companies appear considerably undervalued in relation to other groups of securities. This applies more particularly to the prior charges and guaranteed

stocks, as their interest requirements are covered by a substantial margin, even in the case of L.N.E.R. second guaranteed, the yield on which still exceeds 7½ per cent. Debenture stocks have remained firmly held and are not in large supply in the market at prices indicated by current quotations; mainly because of the small amount of business in evidence, they have not responded to the strength of Government securities.

L.M.S.R. senior preference more than held last week's rally and is 46 at the time of writing, and the 1923 preference at 34½ was unchanged on balance. On the other hand, the ordinary stock was fractionally lower at 12½, but the guaranteed stock improved a point to 74½ and still yields over 5½ per cent., which appears attractive having regard to the undoubted investment merits and the fact that this stock is cumulative as to dividend. L.M.S.R. 4 per cent. debentures were slightly better at 91; the yield offered in this case also seems on the generous side. Great Western ordinary showed moderate fluctuations, and best prices touched in the past few days were not held, but at 31½ the decline on balance was only half-a-point. As to Great Western 5 per cent. preference, there was a fractional gain to 75, but the

guaranteed stock kept at 103½ and the 4 per cent. debentures were again 101½.

Southern preferred lost part of last week's rally, and went back from 42 to 40½, while the deferred eased to 9½. On the other hand, the guaranteed stock kept at 104½, and the preference stock at 72 was also unchanged, and the 4 per cent. debentures continued to have a "middle" price of 93½. Among L.N.E.R. issues, the first preference held last week's rally to 32½ and the second preference was again around 10. Rather better demand was in evidence for the first guaranteed, which improved from 64½ to 66; the second guaranteed was slightly higher at 56. L.N.E.R. 4 per cent. debentures were, however, again 82½ and the 3 per cent. debentures remained at 62½. London Transport "C" was fractionally better.

Few Argentine railway securities were tested by business, but quotations were inclined to become firmer on the reports as to important negotiations for the purchase of Argentine products by the British Government. It is, however, denied that a definite agreement has yet been concluded. Canadian Pacific preference stock was easier, but at 43 was unchanged on balance; dealings in the debentures took place around 84½.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1939-40	Week Ending	Traffic for Week			No. of Weeks	Aggregate Traffic to Date			Shares or Stock	Prices					
			Total this year	Inc. or Dec. compared with 1939	Totals		This Year	Last Year	Increase or Decrease		Highest 1939	Lowest 1939	Oct. 15, 1940	Yield % (See Note)		
South & Central America	Antofagasta (Chili) & Bolivia	834	6.10.40	£ 14,740	+	£ 2,520	40	686,330	£ 531,030	+	£ 155,300	Ord. Stk.	10½	4½	5½	Nil
	Argentine North Eastern	753	5.10.40	ps. 168,400	—	ps. 3,400	14	ps. 2,452,300	ps. 2,555,300	—	ps. 103,000	6 p.c. Deb.	4½	2	2½	Nil
	Bolivar	174	Sept. 1940	3,790	—	510	39	35,970	38,350	—	2,380	Bonds.	5½	4½	6½	Nil
	Brazil	2,801	5.10.40	ps. 1,170,000	—	ps. 10,000	14	ps. 15,649,000	ps. 17,305,000	—	ps. 1,656,000	Ord. Stk.	5½	2	2½	Nil
	Buenos Ayres & Pacific	190	10.8.40	899,500	—	£ 31,600	6	857,500	\$647,500	—	\$90,000	Ord. Stk.	5½	4½	2½	Nil
	Buenos Aires Central	5,082	5.10.40	ps. 1,682,000	—	ps. 336,000	14	ps. 26,067,000	ps. 26,760,000	—	ps. 693,000	Ord. Stk.	13½	4½	4½	Nil
	Buenos Ayres Gt. Southern	1,930	5.10.40	ps. 629,000	—	ps. 52,000	14	ps. 8,640,000	ps. 9,735,000	—	ps. 1,095,000	Ord. Stk.	10½	4	3½	Nil
	Buenos Ayres Western	3,700	5.10.40	ps. 1,362,550	—	ps. 297,700	14	ps. 19,671,100	ps. 28,247,150	—	ps. 8,576,050	Ord. Stk.	10½	4	3½	Nil
	Do.	—	—	—	—	—	—	—	—	—	—	Did.	4	1½	2	Nil
	Cent. Uruguay of M. Video	972	5.10.40	21,334	+	3,291	14	250,743	236,097	+	14,646	Ord. Stk.	2½	1½	1½	Nil
	Costa Rica	188	May 1940	17,282	—	7,020	48	193,339	245,516	—	52,177	Ord. Stk.	24½	18	20	10
	Dorada	70	Sept. 1940	12,200	—	2,200	39	110,700	123,700	—	13,000	1 Mt. Db.	104½	102	98	6½
	Entre Rios	810	5.10.40	ps. 245,100	+	ps. 5,700	14	ps. 3,351,500	ps. 3,841,800	—	ps. 490,300	Ord. Stk.	6	3	1½	Nil
	Great Western of Brazil	1,016	5.10.40	11,200	—	1,100	40	389,100	321,600	+	67,500	Ord. Sh.	3/—	1½	1½	Nil
	International of Cl. Amer.	794	Aug. 1940	\$354,854	—	\$70,916	35	\$4,079,630	\$4,123,397	—	\$43,767	1st Pref.	7½d.	7½d.	1	Nil
	Interoceanic of Mexico	224	Sept. 1940	8,240	+	2,485	39	60,300	55,105	+	5,195	Ord. Pref.	—	—	—	—
	Leopoldina	1,918	5.10.40	27,525	+	3,705	40	906,496	821,207	+	85,289	Ord. Stk.	2½	1	1	Nil
	Mexican	483	31.8.40	ps. 406,600	+	ps. 4,400	9	ps. 2,409,900	ps. 2,469,600	—	ps. 59,700	Ord. Stk.	1½	1	1	Nil
	Midland of Uruguay	319	Aug. 1940	11,140	—	2,792	9	21,363	17,490	+	3,873	Ord. Stk.	—	—	—	—
	Nitrate	386	30.9.40	6,970	+	3,689	39	135,085	87,282	—	47,803	Ord. Sh.	2½	1½	1½	7½
	Paraguay Central	274	5.10.40	\$3,239,000	+	\$147,000	14	\$50,599,000	\$47,581,000	+	\$3,018,000	Pr. Li. Stk.	45½	36	38	13½
	Peruvian Corporation	1,059	Sept. 1940	63,848	—	2,527	13	198,447	192,214	+	6,233	Pref.	1½	1½	1½	Nil
	Salvador	100	3.8.40	8,584	—	£ 5,416	5	£ 54,545	£ 58,932	—	£ 4,387	Ord. Stk.	38	20	30½	8½
	San Paulo	153½	29.9.40	30,000	—	4,387	39	1,426,392	1,262,893	+	163,499	Ord. Sh.	6/6	6/6	9½	9½
	Taitai	160	July 1940	2,085	+	530	4	2,085	1,555	+	530	Ord. Sh.	—	—	—	—
	United of Havana	1,353	5.10.40	15,074	+	1,076	14	219,699	254,394	—	34,695	Ord. Stk.	2	1	1	Nil
	Uruguay Northern	73	Aug. 1940	970	+	144	9	1,900	1,650	+	250	Ord. Stk.	—	—	—	—
Canada	Canadian National	23,695	7.10.40	1,000,227	+	26,717	40	36,683,425	29,422,697	+	7,260,728	—	—	—	—	—
	Canadian Northern	—	—	—	—	—	—	—	—	—	4 p.c.	Perp. Dbs.	74½	60	74	5½
	Grand Trunk	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	100½	76	102	3½	
Canadian Pacific	17,153	7.10.40	738,800	—	134,600	40	25,108,200	21,962,200	+	3,146,000	Ord. Stk.	7½	3½	5½	3½	
India	Assam Bengal	1,329	30.4.40	45,187	+	6,529	4	135,060	120,437	+	14,623	Ord. Stk.	76½	60	72½	4½
	Barri Light	202	10.8.40	2,340	—	38	19	59,377	45,952	+	13,425	Ord. Stk.	—	—	—	—
	Bengal & North Western	2,091	Sept. 1940	223,650	+	46,363	26	1,485,502	1,253,712	+	231,790	Ord. Stk.	277	229½	240	6½
	Bengal Doonars & Extension	161	Aug. 1940	14,265	—	183	22	64,155	52,125	+	12,030	Ord. Stk.	91	84½	215	3
	Bengal-Nagpur	3,269	10.8.40	204,075	+	16,707	19	3,079,954	2,834,428	+	245,526	Ord. Stk.	94½	83½	91	4½
	Bombay, Baroda & Cl. India	2,986	30.9.40	261,000	—	11,175	26	4,770,750	4,242,525	+	528,225	Ord. Stk.	108	90	104	5½
	Madras & Southern Mahratta	2,967	10.8.40	136,050	—	4,946	19	2,221,404	2,198,368	+	23,036	Ord. Stk.	104½	92	99½	7½
	Rohilkund & Kumaon	571	Sept. 1940	38,925	+	4,219	26	323,231	259,075	+	64,156	Ord. Stk.	280	263	250	6½
	South Indian	2,542	20.7.40	121,599	+	10,755	16	1,390,463	1,294,081	+	96,382	Ord. Stk.	102½	88	84½	5½
	Beira	204	July 1940	83,043	—	—	43	747,446	—	—	—	—	—	—	—	—
Various	Egyptian Delta	623	10.5.40	4,591	—	602	6	19,436	20,384	—	948	Pref. Sh.	½	½	½	Nil
	Kenya & Uganda	1,625	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Manila	—	—	—	—	—	—	—	—	—	—	B. Deb.	55	39	47½	7½
	Midland of W. Australia	277	June 1940	10,926	—	618	52	156,230	177,307	—	21,077	Inc. Deb.	91½	87½	82½	4½
	Nigerian	1,900	27.7.40	29,016	+	2,233	18	631,889	480,613	—	151,276	—	—	—	—	—
	Rhodesia	2,442	July 1940	442,978	—	—	43	3,916,232	—	—	—	—	—	—	—	—
	South Africa	13,287	14.9.40	677,201	—	19,055	24	16,160,635	15,439,277	+	721,358	—	—	—	—	—
Victoria	4,774	June 1940	797,185	+	103,739	52	9,942,449	9,360,329	+	582,120	—	—	—	—	—	

Note. Yields are based on the approximate current prices and are within a fraction of ½. Argentine traffic is now given in pesos
 * Quotation is of June 17, 1940; dealings subsequently prohibited † Receipts are calculated at 1s. 6d. to the rupee